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ABSTRACT

This paper provides the description, documentation and users' and programmers' guide for the keyword out of context (KWOC) library indexing system, with coding references, program flow charts, program listings, procedure flow charts and instructions for maintenance and operation. (Author)

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M70-46

USER'S GUIDE TO THE KEY-WORD-OUT-OF-CONTEXT (KWOC) INDEX

(HOW TO HARNESS THE KWOC)

MITRE WASHINGTON LIBRARY

by

W. R. Flury and D. Henderson

002383

SEPTEMBER 1970

This document has been approved for public release

THE MITRE CORPORATION
Washington Operations

ABSTRACT

This paper provides the description, documentation and user's and programmers' guide for the keyword out of context (KWOC) library indexing system, with coding references, program flow charts, program listings, procedure flow charts and instructions for maintenance and operation.

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SECTION I

INTRODUCTION

The MITRE Corporation Policy and Procedures manual (L.1) states, "It is MITRE policy to provide a facility and an organization to acquire, control, store and retrieve information in the form of books, pamphlets, periodicals and reports, needed by MITRE in the prosecution of its mission." In implementing this policy the Washington Library recently instituted a Key-Word-Out-of-Context (KWOC) index for the technical reports collection. This paper provides some background information about the KWOC system; guides to the Library Staff, Technical Staff and Administrators on how to use the system; and programmer notes including flow charts and program listings for program maintenance.

What is a KWOC Index?

A KWOC index is a special form of index in which: (1) an entry is created for every substantive word in the report title, and (2) entries show the substantive word (keyword) and the portion of the context out of which the word was obtained. A sample of a KWOC index is shown in Figure 1.

A KWOC index is a special form of a Key-Word-In-Context (KWIC) index. Both KWOC and KWIC are based on the selection of keywords directly from the title alone or from a more complete bibliographic citation.

A more complete discussion of the theoretical background and the underlying structure of both KWOC and KWIC indexing is presented in Appendix I.

DEFINITION	MW7579	AN INTERACTIVE SYNTAX* DEFINITION FACILITY THESIS(MS) -FANES.R.S. SDF*
DEFINITION:	MW7513	BASELINE SYSTEM DEFINITION: URBAN GRAVITY-VACUUM-TRANSIT -EDWARDS.L.K.
DEFLECTION	MW7253	USE OF COANDA EFFECT FOR THE DEFLECTION OF JET SHEETS OVER SMOOTHLY
DEFLECTION	MW7254	USE OF COANDA EFFECT FOR THE DEFLECTION OF JET(S)* SHEETS OVER SMOOTHLY
DELIVERY	MW7304	JET DELIVERY OPTIMIZATION. FINAL-RPT. CONSTRUCTION* LIQUID-JETS*
DELPHI-METHOD*	MW3574	EXPERIMENTS IN GROUP PREDICTION(S)* -DALKEY.N.C. DELPHI-METHOD* /680300
DELPHI-METHOD*	MW3724	THE DELPHI-METHOD* AN EXPERIMENTAL STUDY OF GROUP OPINION -DALKEY.N.C.
DELPHI-METHOD*	MW3724	THE DELPHI-METHOD* AN EXPERIMENTAL STUDY OF GROUP OPINION -DALKEY.N.C.
DELTA-2	MW7329A	DELTA-2 AT MACH-NUMBERS* TO 1.65 AND COMPARISONS WITH WIND TUNNEL
DEMAND	MW7480	EVALUATION OF THE MEDLARS* DEMAND SEARCH SERVICE. INFORMATION-RETRIEVAL*
DEMAND	MW7493	THE QUEENS LONG ISLAND TRAFFIC* DEMAND MODEL. NEW-YORK* TRANSPORTATION*
DEMAND	WP7140	WORK STATEMENT ATTACHMENT FOR A DEMAND ACTIVATED BUS SYSTEM CONTRACT
DEMANDS	MW7191	TRAVEL DEMANDS IN 1990: EVALUATING FUTURE NEEDS. TRANSPORTATION* ROADS*
DEMONSTRATING	WP8444	TECHNIQUE FOR DEMONSTRATING CLUTTER ALLEVIATION TOS-NO.-16) -MULLIN.F.R.
DEMONSTRATION	MTR4128	SAFEGUARD BENCHMARK DEMONSTRATION PROGRAM DESCRIPTION .D-35 /700402
DEMONSTRATION	MW6035	MILITARY STANDARD: MAINTAINABILITY DEMONSTRATION /660200
DEMONSTRATION	WP9331	PERFORMANCE DEMONSTRATION FOR A SECOND GENERATION MEDLARS -GOSDEN.J.A.
DENTAL	WP9554(S)	SAFEGUARD DATA PROCESSING FEASIBILITY STUDY & DEMONSTRATION
DEOXYGENATION*	W2222/SRI(C)	INSURGENT SUPPORT DENTAL MEASURES FOR SOUTHERN THAILAND
DEPARTMENT	MW7363B	DEOXYGENATION* /680500 *ILLINOIS-UNIV-URBANA-WATER-RESOURCES-CENT
DEPARTMENT	MW3889	ECONOMICS DEPARTMENT PUBLICATIONS 1948-1962 AN AUTHOR INDEX OF THE OPEN
DEPENDENCE	MW3978	PUBLICATIONS OF THE LOGISTICS DEPARTMENT -GRUSKY.J. -SCHNEIDER.R.ED.
DEPLOYMENT	MW3982	A MATRIX TECHNIQUE FOR DESCRIBING REPORT DEPENDENCE IN INFORMATION
DEPLOYMENT*	W2731/AFAL(S)	CONTINUOUS DEPLOYMENT OF DECOYS* FIRST INTERIM TECH RPT
DEPLOYMENT*	MW7470B	AUTOMATION* DEPLOYMENT* COMPUTERS* /690200 :ECAC-TN-006-36
DESCENT	W2731/AFAL(S)A	-SMITH.E.H. -WRIGHT.F.L. DEPLOYMENT* MISSILES* FLARES* =AD393298
DESCRIBING	MW7339	HYBRID CONJUGATE(S)* GRADIENT-STEEPEST DESCENT ALGORITHMS* FOR
DESCRIPTION	MW3982	A MATRIX TECHNIQUE FOR DESCRIBING REPORT DEPENDENCE IN INFORMATION
DESCRIPTION	MTR4128	SAFEGUARD BENCHMARK DEMONSTRATION PROGRAM DESCRIPTION .D-35 /700402
DESCRIPTION	MW7419	A DESCRIPTION AND DEFINITION OF SIMPLE AMBIT/G: A GRAPHICAL
DESCRIPTION	MW7450L	PROGRAM DESCRIPTION VOLUME-3 SIMULATION* SUBSYSTEM. THE NMCSSC
DESCRIPTION	MW7451L	PROGRAM DESCRIPTION VOLUME-2 PLAN GENERATION SUBSYSTEM PART-A
DESCRIPTION	MW7456L	GENERAL DESCRIPTION THE NMCSSC QUICK-REACTING GENERAL WAR-GAMING*
DESCRIPTION	MW7458L	PROGRAM DESCRIPTION VOLUME-1 DATA INPUT AND OUTPUT SUBSYSTEMS. THE
DESCRIPTION	MW7526A	TACTICAL DOCTRINE DIVISION THROUGH ARMY GROUP VOL-II DESCRIPTION OF THE
DESCRIPTION	MW7577	COLI A COMPUTER DESCRIPTION LANGUAGE PART-I THE NATURE OF THE
DESCRIPTION	MW7577A	DESCRIPTION LANGUAGE AND ORGANIZATION OF DESCRIPTIONS PART-III KINDS OF
DESCRIPTION	WP9574	DESCRIPTION OF NMCSSC* WORKLOAD -TAYLOR.S.B. -WOOD.D.C. COMPUTERS*

FIGURE 1
KWOC LISTING

Each index entry in The Washington Library KWOC index is generated from a technical report citation. The manner in which it is generated is shown in Figure 2. After such entries are generated for a collection of reports they are sorted and the KWOC output listing is generated. In this listing one line is printed for each index entry. The line contains the keyword on the left, and in the wider field on the right, the context out of which the keyword was obtained.

Is This A Standard KWOC Index?

No. The Washington Library has adapted the basic KWOC technique to the special circumstances that pertain there. Three adaptations have been made. Each is aimed at further improving the usefulness of the index in The Washington Operations environment. The adaptations are:

(1) multi-card citation input,

(2) input tagging, and

(3) input enrichment,

These adaptations, along with some of the rationale behind them, are discussed below.

TECHNICAL REPORT

MW7607
AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES

INPUT CARD

MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES

INDEX RECORDS GENERATED

KEYWORD FIELD	CONTEXT FIELD	
MW7607	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES
EFFICIENT	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES
METHOD	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES
IMPROVING	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES
HOUSING	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES
LOW-INCOME	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES
FAMILIES	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES

SORTED INTO SEQUENCE

EFFICIENT	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES
FAMILIES	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES
HOUSING	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES
IMPROVING	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES
LOW-INCOME	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES
METHOD	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES
MW7607	MW7607	AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW-INCOME FAMILIES

FIGURE 2
GENERATING A KWOC INDEX

Multi-Card Citation

A standard KWOC index uses a single card input per report. This normally allows the opportunity to input the report accession number and about 60 characters of the title. Over half of the technical reports received by The Washington Library have titles significantly longer than 60 characters. In order to assure the possibility of obtaining the full title on input, a multi-card citation input process was developed. Details of the process of preparing the input are presented in Section II under KWOC Input Processing.

In addition to assuring input of the full report title, the multi-card citation input readily permits the addition of any other desired information for indexing purposes. During development of the KWOC index various elements in Washington Operations desired to include 8 other reference entries:

- Author
- Corporate Source
- Corporate Report Number
- Date
- Other Identifying Number
- Department Number
- Contract Number
- Task Number

With the number of input cards substantially unlimited it is possible to include all of these and others if this is desired in the future.

Input Tagging

Tagging is a feature of the Washington KWOC index which was developed at MITRE to overcome a basic KWOC format problem. Users of both KWIC and KWOC indexes have found it annoying to scan down the li of keywords and find authors' names, department identifiers and originators' document identifications intermixed in the listing sequence with keywords from titles. This problem is further complicated, in the case of The Washington Library, by a requirement to include in the index the many other items of bibliographic information, along with titles. Many of these are alphanumeric and would, normally, sort into sequence with title keywords in the output listing.

The solution developed for this problem begins with assigning special character tags to be prefixed, on input, to each of the non-title items desired in the index. See Table I. These tags are carrie by the system through the keyword sorting process. Since the tags are in the high-order (left-most) position for the index sort, they force like items together. After sorting, the print program deletes the tags from the left margin field but leaves the sorted records in the sequence in which they were put before the tags were deleted.

The resulting output is, thus, divided into 10 major segments corresponding to the 10 types of tags and the 10 items of interest. Title words appear in the subject index section; authors' names all appear together and in alphabetic sequence; dates appear together and in sequence from earliest to most recent and are not intermixed with project numbers, and so on.

TABLE I

ITEM DESIRED FOR CITATION

ITEM	EXAMPLE	TAGGED FORM
Title	Growth of Urban...	Growth of Urban
Author(s)	Jones, J. P.	-JONES, J. P.
Corporate Source	RAND	*RAND
Corporate Report Number	P-1234	:P-1234
Date	680929	/680929
AD, PB or NASA Number	AD 123 456	=AD123456
Department Number	D-31	.D-31
Contract Number	F19(628)-68-C-0365	+F19(628)-68-C-0365
Project or Task Number	31.5.0	%31.5.0
Accession Number		
Internal documents (3 different series)	WP1234	•WP1234
	MTR 456	•MTR456
	M67	•M67
External	MW 2468	•MW2468

NOTES: The black dot • is used in the above illustration as a visible substitute for a numerical quantity, hexadecimal 00, for which no printable 360 character has been assigned. This quantity is automatically prefixed to the accession number by the KWOC program. When the accession numbers are printed, the unprintable character does not print and a blank appears in its place.

One bonus of this approach is the ability to reconstitute the multiple input card images in their original sequence, at the beginning of the listing. The basic conditions to permit this are set when the accession numbers, treated as keywords, are pulled together by their tags and sequenced. Since every citation normally requires two to three cards of input, a convention was established to enter the accession number first on each card and to suffix card sequence letters to the accession number on each card as required. The result, after keyword sorting, is the complete citation as originally entered.

The basic citation section of the listing is bound separately from the others and used side-by-side during searches of the other portions of the index. This separate list is especially useful when the context from which the keyword was obtained (the content of the card on which it appeared) happens not to include the other items with which the user is trying to coordinate the term he is accessing. See Section III for more details on the use of the basic citation listing.

Input Enrichment

Another standard objection to conventional KWOC indexing centers around the problem of non-informative titles, titles which do not contain good, descriptive keywords. As a hedge against lost information, it was decided for this application to enrich the basic KWOC citation with human indexing. Enrichment, in this application, is defined as the adding of extra index terms which do not appear in the title or with the other standard bibliographic data in the document.

In the input processing stage of the system, all of the basic citation information is obtained from the document by a library aide.

The professional indexer scans this for accuracy and also makes a determination as to whether or not the title is properly descriptive. If enrichment is deemed desirable, the indexer adds extra terms to the input record and suffixes them with an asterisk. The indexer is also encouraged, when time permits, to highlight particularly descriptive terms in the title. These are also indicated with the suffixed asterisk.

Additional Background Information

The KWOC index is currently being used with a collection of over 10,000 technical reports growing at a rate of approximately 6,800 per year. Report subject matter is varied representing the combined interests of 370 technical staff members working on diverse military and civilian systems engineering problems. The rest are internally generated. Of the former, about two-thirds are obtained from the Defense Documentation Center (DDC) or the National Technical Information Service (formerly the Clearinghouse-CFSTI). The others are obtained directly from the originating organizations.

The system is based on use of three programs run on the IBM 360/50 in a multi-programming mode under OS 360, Version 18 with HASP (Houston Automatic Spooling Processor, an I/O expediting feature). The programs are: KWOC1, which generates the basic index record; the Sort-Merge utility program of OS 360, and KWOC2 which prints the output. These three programs are used to prepare and check the newly indexed material weekly. After checking, newly indexed records are

accumulated and, periodically, inserted into the master file with the Sort-Merge utility under Job Control Language (JCL). The master file is currently printed in its entirety at the same time.

Weekly cumulative index, sort and print runs for up to 800 documents require less than 5 minutes of computer time. Master file merge and print runs, printing the complete index, have not yet exceeded 12 minutes of charged computer time.

SECTION II

PROCESSING IN THE LIBRARY

How Incoming Reports are Processed

The flow of technical reports through the Library accessions and indexing processes is shown in Figure 3.

Accessions Process

Almost all technical reports in the library are obtained at the request of members of the MITRE Technical Staff. When requesting a report the staff member completes form MCF 1825, 9/70 Figure 4. From this form the library takes the bibliographic information, and, if the report is not already in the collection, submits an order to the appropriate supplier. Request forms are filed in a pending request file (ringbinder) until fulfilled by receipt of the report.

KWOC Input Processing

When the requested report is received the request form is removed from the binder by the library aide. The aide then handwrites* such information as can be readily obtained from the request form onto a 5x8 Bibliographic Record Card (sometimes called Shelf List Card). See Figure 5.

The partially completed Bibliographic Record Card is next given to the indexer. The indexer checks the aide's work and completes any portions of the bibliographic entry which the aide was unable to

*Handwritten entries on the form are currently specified as a work saving measure. Since all of the information on the form later appears in the computer printed KWOC output, and since the Bibliographic Record Card is used primarily as a filed record the handwriting of this record constitutes no significant legibility problem.

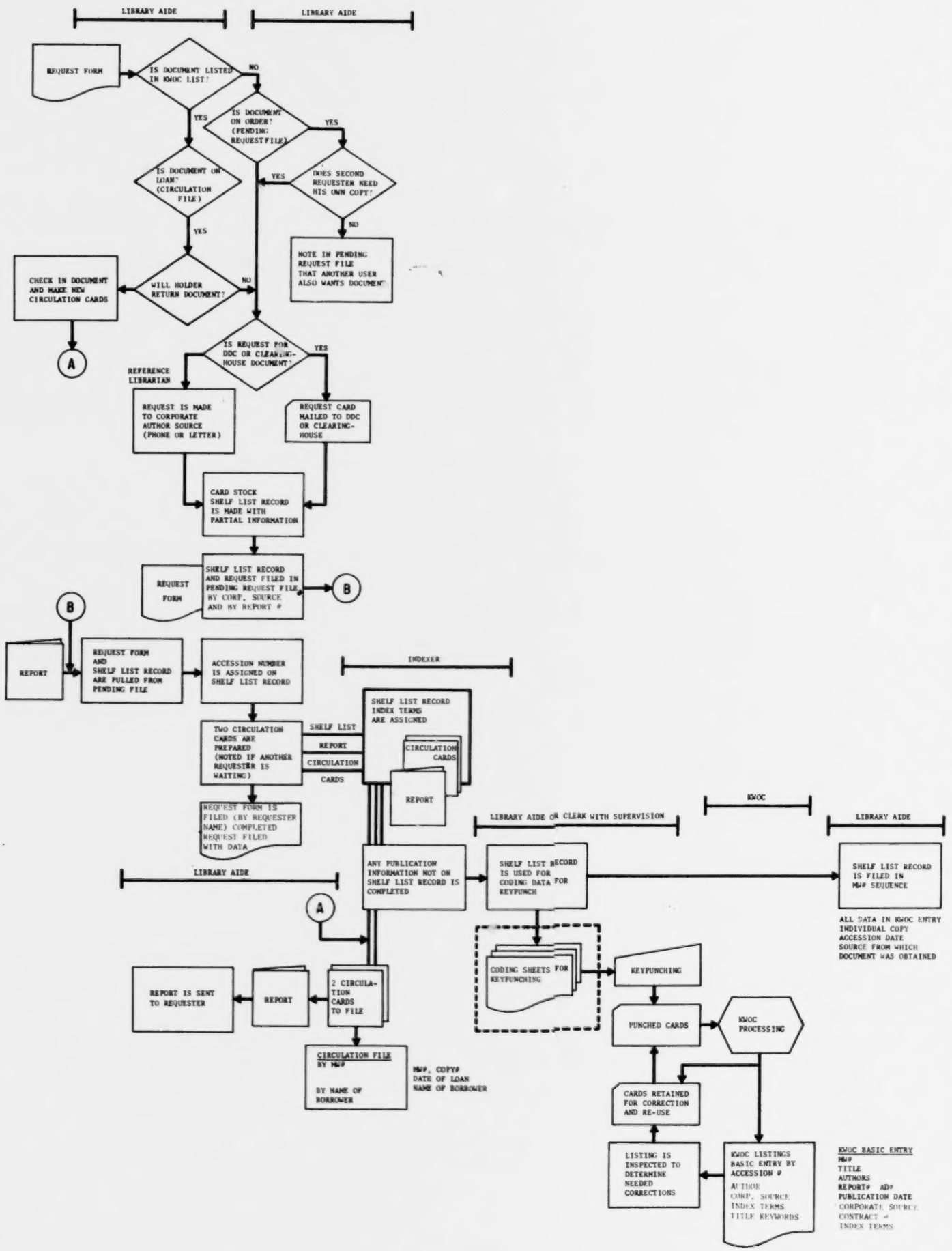


FIGURE 3
WORK FLOW
TECHNICAL REPORTS ACCESSION & INDEXING

MITRE/WASHINGTON LIBRARY

OPEN LITERATURE COLLECTION REQUEST

Use separate form for each item requested, filling in ONLY blanks applicable

LIBRARY USE ONLY:

Call # _____ Date Ord. _____

PR No. _____ Price _____

Supplier _____

Requester J. J. SMITH

Dept. D-31 Mail Stop # W-XXX

Tel Ext 2222 Date 10/15/70

If item not received by 15 JAN 1971 cancel request

BOOK, HEARING & PAMPHLET

Author (s) OLSEN, E.O.

Title AN EFFICIENT METHOD OF IMPROVING THE HOUSING OF LOW INCOME FAMILIES

Year DEC '64 Publisher RAND

JOURNAL ARTICLE

Title _____

Vol. & Date of Journal _____

Page (s) of Journal Article _____

SUBSCRIPTION

Title _____

Publisher _____

Period the Subscription is to begin _____

Material is definitely available at the following outside source: RAND

ADDITIONAL REQUIREMENTS FOR OBTAINING --

BOOKS (check box)

- ☐ Interlibrary loan only
- ☐ Order for library collection. Send to requester on 2 wk. loan. Subject to renewal and to recall.
- ☐ Order for requester on extended loan of 3 months (subject to renewal and recall). NOTE: Must have approval of sub dept. head or manager's signature.

SUBSCRIPTIONS (check box)

- ☐ Order for library collection. To be sent to the library.
- ☐ Order and have sent direct to requester. (Requires your department head signature)

_____
Sub Department Head or Manager's Signature

_____
Department Head Signature

MCF 1825 9/70 LIBRARY COPY

FIGURE 4
REPORT REQUEST FORM

ID NO. = AD 698 148 CONTROL NO. MW 7606

CORPORATE ORIGIN * Rand

TITLE An Efficient Method of Improving the Housing of Low Income* Families

AUTHOR(S) – Olsen, C. O.

PUBL. DATE / Dec. 69

REPORT NO. : P-4258 DEPARTMENT

TASK NO. %

INDEX TERMS *

FIGURE 5a
LIBRARY SHELF LIST CARD, SIDE 1

PAGES

ORDERED FOR Swetnam

REC'D FROM C

PRICE $3.00

MF

HC ✓

FIGURE 5b
LIBRARY SHELF LIST CARD, SIDE 2

MW 7606
C. 1

DATE	ISSUED TO
1-1-71	Smith, J. J.

MCF-1517

FIGURE 6
REPORT CIRCULATION CARD

complete. The indexer, at this point, may determine that the contents of the document are not adequately described by the terms in the title. In such cases the indexer assigns additional terms and records them on the Bibliographic Record Card in the appropriate place. Descriptive terms assigned by the Indexer follow the standards suggested in Standard for Descriptive Cataloging of Government Scientific and Technical Reports Revision 1, AD #641092, October 1966. Index terms assigned by the indexer are taken from The Thesaurus of Engineering and Scientific Terms, First Edition, Engineer's Joint Council, New York, December 1967, or later editions as available. The indexer may also consult other guides such as the latest edition of the NASA Thesaurus.

Upon completion of this stage of processing the technical report is charged out to the requester. Two circulation cards (Figure 6) are filed, one by library accession number and one by borrower name. The request sheet is filed in a binder of completed requests, by requester name. The Bibliographic Record Card is returned to the aide who uses it as a source document for transcription of the information onto a keypunch coding sheet. The rules for coding for keypunching are fully described in Appendix II, Reference Data for Coding KWOC Input. See Figure 7 for sample of the completed keypunch coding sheet. After coding, the Bibliographic Record Card is filed by accession number as a permanent Shelf List record. The coding sheets are sent, in daily batches, to the MITRE Washington Computer Center (MWCC) for keypunching.

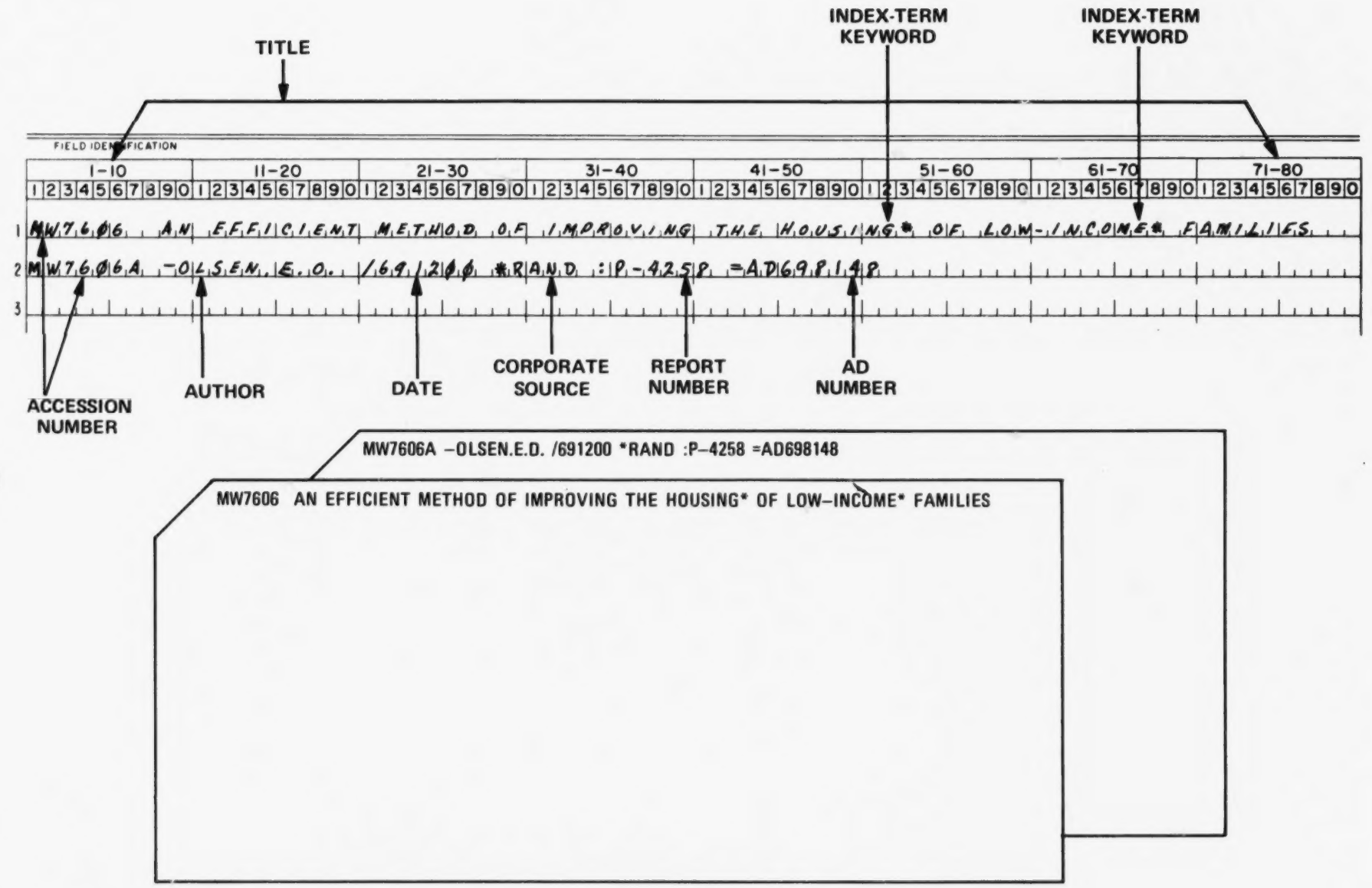

TITLE
INDEX-TERM KEYWORD
INDEX-TERM KEYWORD
FIELD IDENTIFICATION
1-10
11-20
21-30
31-40
41-50
51-60
61-70
71-80
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0
1 MW7606 AN EFFICIENT METHOD OF IMPROVING THE HOUSING* OF LOW-INCOME* FAMILIES
2 MW7606A -OLSEN,E.O. /691200 *RAND :P-4258 =AD698148
3
ACCESSION NUMBER
AUTHOR
DATE
CORPORATE SOURCE
REPORT NUMBER
AD NUMBER
MW7606A -OLSEN.E.D. /691200 *RAND :P-4258 =AD698148
MW7606 AN EFFICIENT METHOD OF IMPROVING THE HOUSING* OF LOW-INCOME* FAMILIES

FIGURE 7
CODING AND KEYPUNCHING KWOC DATA

How KWOC Reports Are Produced

In producing the arious KWOC outputs two computer procedures are used. One of these is usually run once a month and is called "Monthly Run." This run consists of two jobs run together. They are called CUMULIST, Job 1 and PRINT, Job 2. See Figure 8 for a flow chart. The first job accepts as input the cards for all of the new accessions during the previous month. It prepares index records for these cards and sorts them. It then produces an output listing of these records in standard KWOC format. This output is printed on white paper for reproduction as a Working Paper and for distribution to the Technical Staff as a current awareness service.

In the second part of the monthly run the sorted index records from the first part of the run are merged with the index records in the master file on magnetic tape. This job then produces a listing of the total KWOC index including all records ever entered. This is printed on three part paper (or three times at the Library's option) on striped paper. These outputs are used as the current working copies in the Library processing area, in the Library reading room and in the Bedford Library.

The other major run is performed once a week and is called "Weekly Run." See Figure 9 for a flow chart. This run accepts as input the cards representing all accessions since the last monthly run. In the first week after the monthly run it operates with one week's accessions in the second week, two weeks' accessions; and so on. This run also

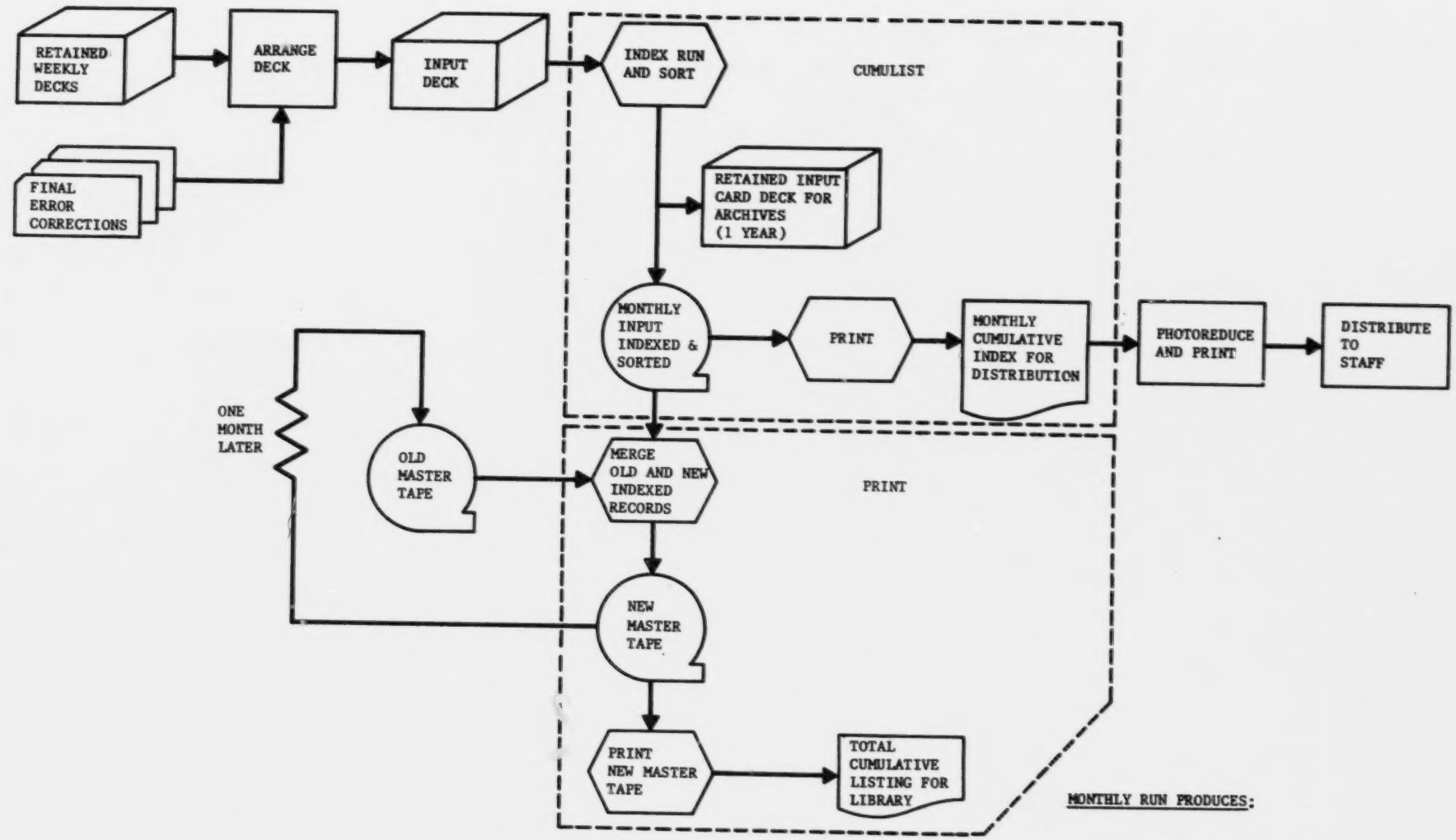


FIGURE 8
FLOW CHART FOR MONTHLY ACCESSIONS PROCESSING

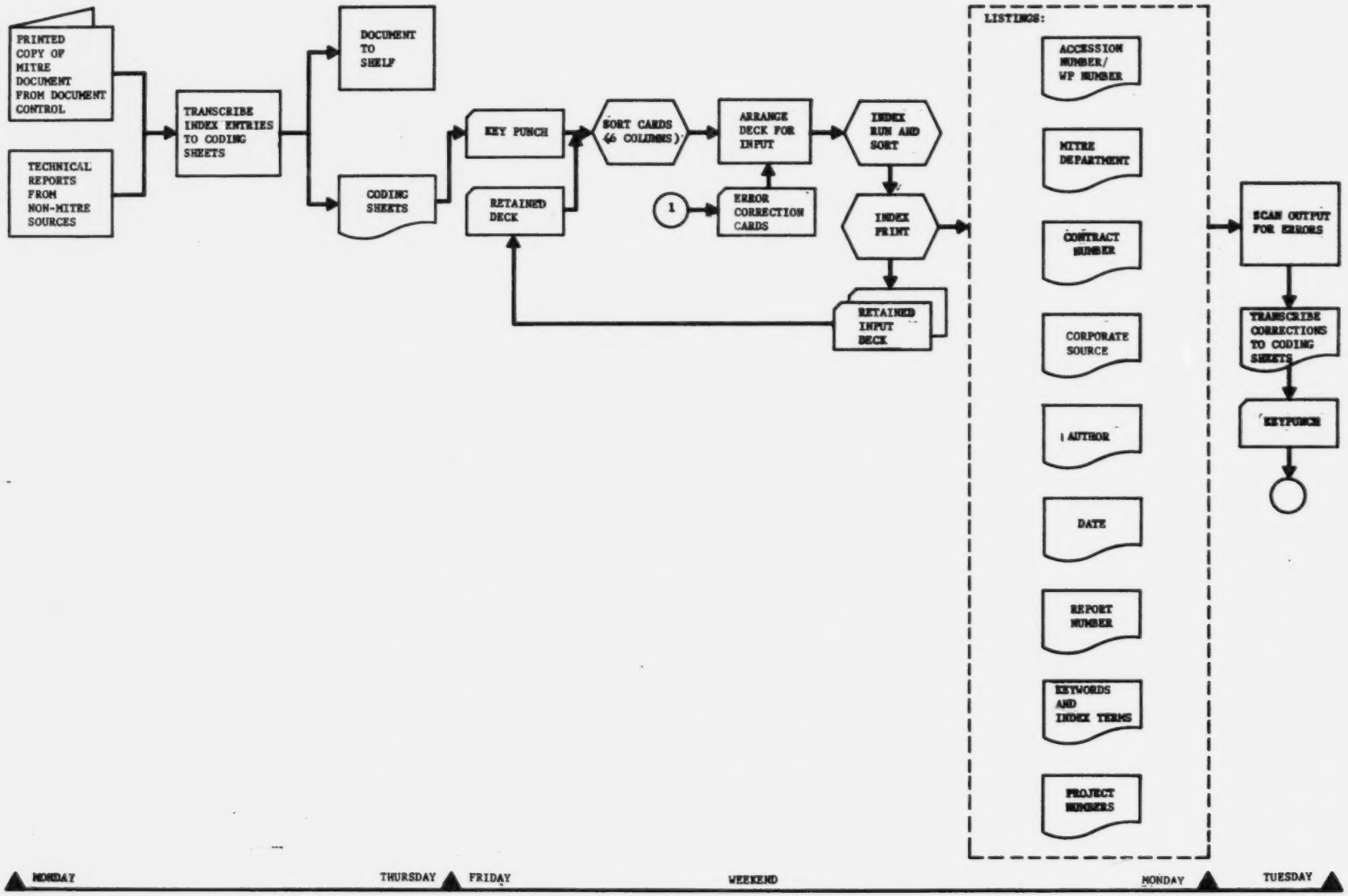


FIGURE 9
FLOW CHART FOR WEEKLY ACCESSIONS PROCESSING

CUMULATIVE WEEKLY LISTING

REGULAR WEEKLY PRODUCTION RUN

consists of two job steps. The first, KWOC1, indexes all of the input records, sorts them and creates an output data set for printing. The second step, KWOC2, prints the records in standard KWOC format. The output is printed on striped paper. It is used by the library aide and the indexer to check the input to KWOC for errors. It also serves as the current cumulative accession list supplement until the next monthly run.

Another run called CHECKOUT is used to aid in checking any set of input cards which has never been run before. It is very similar to the weekly run. See flow chart in Appendix III. It is normally used to check the fourth week's input to the monthly run prior to its entry as input to the monthly run.

The detailed procedures for obtaining the Monthly and Weekly Runs are described in Appendix III.

SECTION III

HOW TO USE KWOC

The main purpose of KWOC is to permit staff members to locate and obtain technical reports in the library easily and efficiently. The KWOC index can also provide certain valuable information directly without obtaining any reports. In order to locate a report, the KWOC user must: (1) search the KWOC listing for the appropriate entries; (2) extract the report accession numbers; and then (3) obtain the desired report from the library staff. If the user is just interested in obtaining information about reports he needs only to search the index and obtain the information directly from the listing.

Locating a Report - Single Term Search

When trying to locate and obtain (retrieve) a report from the library the staff member may use either a single term search strategy or a multiple term search strategy. In a single term search the KWOC user must have in mind one of the following:

- any significant word in the title
- the name of any of the authors
- the name of the organization that produced the report
- an index term under which the report is likely to have been indexed (by the Library indexer)
- the originating organization's report number

- the task number under which the report was produced (MITRE documents)
- The Department number of the originating department (MITRE documents)
- the DDC identification number (AD Number)

With any one of these the user can scan the listing at the appropriate point and locate all the reports indexed under that one keyword or term.

For example, to find a specific item, DDC Report AD681472, a searcher looks in that section of KWOC that lists AD number (Figure 10). Here he will find that AD681472 has been accessioned under MW3210. To order a copy of the document, the searcher merely asks the Library staff for MW3210. If he wishes to know the full title of the document, the searcher may then turn to the bibliographic citation section.

Locating a Report - Multiple Term Search

When performing a single term search on the AD number or the originating organization's report number the user will find (if he finds anything under that number) only one report for each index entry. When searching on other terms the user may find more than one report for each term. For example, the KWOC index will list many reports under the keywords "COMPUTER" and "SYSTEM." If the user is looking for just one report or just a few reports from among those he can ease the search by thinking of one or more other terms under which

```
AD678514        MW2893B *L.G.HANSCOM-FIELD-MASS-ELECTRONIC-SYSTEMS :ESD-TR-68-426 =AD678514
AD678589        MW2981B *ROME-AIR-DEVEL-CENTER-GRIFFISS-AFB-NY :RADC-TR-68-341 =AD678589
AD678779        MW3983B HUMAN-FACTORS* /610000 *FOREIGN-TECH-DIV-WRIGHT-PATTERSON-AFB =AD678779
AD679176        MW3173C :AFCSR-68-0049 =AD679176
AD679269        MW3156B =AD679269
AD679271        MW2913B *LEO-J-COHEN-ASSOC =AD679271
AD679272        MW2912B *LEO-J-COHEN-ASSOC =AD679272
AD679544        MW3535B *L.G.HANSCOM-FIELD-MA-ELEC-SYSTEMS-DIV :ESD-TR-68-371 =AD679544
AD679613        MW7511A MAGNETIC-ALLOYS* JAHN-TELLER-EFFECT* /681100 =AD679613
AD679915        MW2934B /681200 *ILLINOIS-UNIV-URBANA-COORDINATED-SCIENCE-LAB :R-398 =AD679915
AD680011        MW2935B HANDBOOKS* /691000 *WRIGHT-PATTERSON-AFB-OH :ASD-TR-68-45 =AD680011
AD680248        MW3047C INFORMATION-PROCESSING* *SDC-SM :TM-3628-002-00 =AD680248
AD680254        MW3384B *NATIONAL-CO-MELROSE-MA :RD-68-39 =AD680254
AD680412        MW3294C *MICHIGAN-STATE-UNIV-EAST-LANSING-DIV-OF-ENGRG-RES =AD680412
AD680815        MW3018C =AD680815
AD681108        MW3048A COMPUTER-SYSTEMS* GRAPHICS-RESEARCH* /690100 *RAND :P-4014 =AD681108
AD681149        MW3985B *SYLVANIA-ELECTRONICS-SYSTEMS-WALTHAM-MA-APPLIED-RESEARCH-LAB =AD681149
AD681472        MW3210B *DATA-DYNAMICS-INC-LOS-ANGELES-CA :ESD-TR-68-455 =AD681472
AD681701        MW3986A MAINTENANCE* /681100 *LOGISTICS-MGT-INST-DC =AD681701
AD681834        MW7280B =AD681834 =N69-21860
AD681857        MW3803B *WEATHER-BUREAU-SALT-LAK-CITY-UT :WR-35 =AD681857
AD682023        MW7410A /680600 *SRI-MENLO-PARK-CA :STR-49 =AD682023
AD682120        MW3837B *BOEING-SCIENTIFIC-RESEARCH-LABS-SEATTLE-WA :D1-82-0795 =AD682120
AD682169        MW3987B *FOREIGN-TECH-DIV-WRIGHT-PATTERSON-AFB =AD682169
AD682237        MW3988B :FTD-MT-24-391-67 =AD682237
AD682311        MW3849C :UNI-TRANS-778 =AD682311
AD682339        MW3541B *ACA-LABORATORIES-PRINCETON-NJ :AFOSR-69-0272TR =AD682339
AD682900        MW3989B *STANFORD-UNIV-CA-UNIV-LAW-SCHOOL =AD682900
AD682902        MW3990B *STANFORD-UNIV-CA-UNIV-LAW-SCHOOL =AD682902
AD683255        MW7423B MILITARY-OPERATIONS* *RAND :RM-5788 =AD683255
AD683362        MW3518B /681200 *MASS-COMPUTER-ASSOC-INC-WAKEFIELD =AD683362
AD683362        MW3791B *ARMY-ELECTRONICS-COMMAND-FT-MONMOUTH-NJ :ECOM-5236 =AD683362
AD683474        MW3991B *PICATINNY-ARSENAL-DOVER-NJ-DATA-PROCESSING-OFFICE :TM-1871 =AD683474
AD683670        MW3519B *SDC-SM :TM-3629-003-000 =AD683670
AD683686        MW3729A /690100 *FAA-DC =AD683686
AD683714        MW3992A *MITRE-CORP-BEDFORD-MA :ESD-TR-68-445 =AD683714
AD683746        MW7444A /690200 *RAND :P-4023 =AD683746
AD684386        MW3760A *RAND :P-4000 =AD684386
```


FIGURE 10
AD NUMBER SEARCH

the report might be indexed and using them in a multiple term search. In most cases the user will find the reports he is looking for just by looking up the other terms and scanning the index entries associated with those terms. A user looking for reports on design of on-line systems would do best to search first under the least common of the three terms, on-line, and scan the entries for the more common words design and system. The user who does this will find entries such as:

```
ON-LINE      MW4307   AN ON-LINE DEBUGGER FOR OS/360 ASSEMBLY LANGUAGE PROGRAMS -JOSEPH.W.H.
ON-LINE      MW4355   DESIGN CONSIDERATIONS FOR AN ON-LINE MANAGEMENT SYSTEM
ON-LINE      MW7502   DOCUMENT VECTOR MODIFICATION IN ON-LINE INFORMATION-RETRIEVAL* SYSTEMS
ON-LINE      MW8059   EVALUATION OF USER REACTIONS TO A PROTOTYPE ON-LINE
ON-LINE      TM5025   PROPOSED DESIGN FOR AN ON-LINE INFORMATION RETRIEVAL SYSTEM -KINNEY.O.R.
ON-LINE      WP9005   PRELIMINARY DESIGN NOTES FOR TRANSPORTATION ON-LINE PLANNING TOP) SYSTEM
ON-LINE      WP9221   TECHNICAL DESIGN APPROACH TO SASM ON-LINE PLANNING SYPPORT -MAYER.R.P.
ON-LINE      WP9229   2250 SERVICES PROVIDED BY STAGE-2 OF THE MITE ON-LINE SYPPORT SYSTEM
```

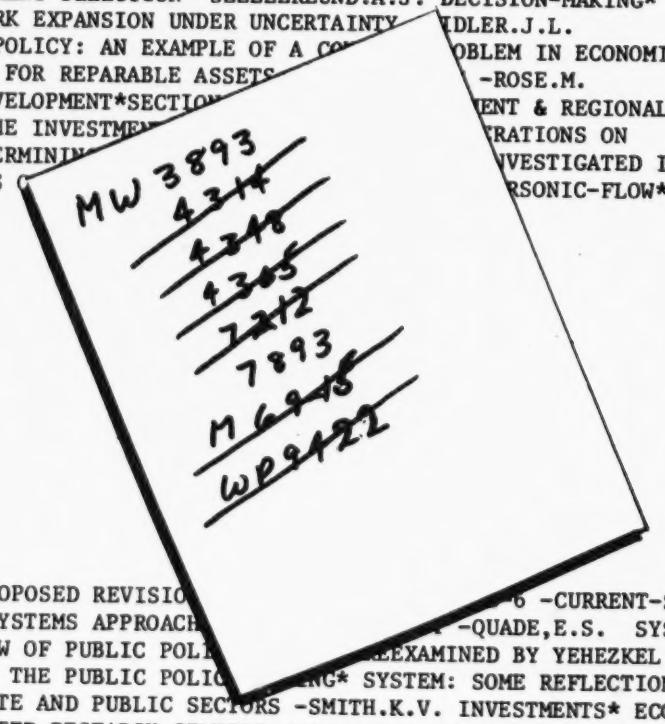
It does not always occur, however, that the several terms the user wants to associate in a multiple term search will appear in the same index entry. Sometimes they do, in such entries as MW4355, TM5025, and WP9005. Some titles are very long, however, and carry over to another input card. Entries MW8095, WP9005, and WP9229 carry over. Since each card is treated independently, related keywords may appear in separate entries. The key to coordinating such keywords lies in making effective use of the report accession number to tie them together.

Suppose a user wants to obtain all reports held on public investment policy. Translated into search terms this means that he wants all reports indexed under the keyword public which are also indexed under investment and are also indexed under policy.

The basic technique used to perform such a search is to enter the index with the least likely keyword and list all of the accession numbers for entries under that term. Then, the user goes to the next least likely term and looks for entries with accession numbers the same as on the initial list, crossing out all that are not found among the entries. Then, on the next term for the same operation, and on and on until the search is completed. The remaining list of accession numbers represents the set of reports which satisfies the search. In the example shown in Figure 11 the user has gone first to the keyword investment and has listed all of the accession numbers for reports indexed under that keyword. Then, after noting these, he has gone to the index entries for the keyword public and has crossed off all accession numbers from the investment list not found under the entries for public. The two remaining entries, MW3893 and MW7893, could then be checked against the entries for the keyword policy, but, since there are only two it is easier just to go to the complete citation section of the listing and read the complete entries for both documents.

This basic, list preparation approach can be used for any multiple term search. Other logical combinations of terms can be used in searching. The search illustrated in the figures required

```
INVESTIGATIONS   WP9472A  INVESTIGATIONS -BARDSLEY.P.P. .D-31 /690425 %31.6.0
INVESTMENT       MW3893   RANKING AND SELECTION METHODS FOR CAPITAL INVESTMENT DECISIONS IN
INVESTMENT       MW4314   CRITERIA FOR INVESTMENT SELECTION -SEELEEREUND.A.J. DECISION-MAKING*
INVESTMENT       MW4348   INVESTMENT IN NETWORK EXPANSION UNDER UNCERTAINTY      IDLER.J.L.
INVESTMENT       MW4365   OPTIMAL INVESTMENT POLICY: AN EXAMPLE OF A CO          OBLEM IN ECONOMIC
INVESTMENT       MW7212   AN INVESTMENT MODEL FOR REPARABLE ASSETS               -ROSE.M.
INVESTMENT       MW7893   SECT-3A ECONOMIC-DEVELOPMENT*SECTIO                    ENT & REGIONAL
INVESTMENT       M69-15   COMPUTER USAGE IN THE INVESTME                         RATIONS ON
INVESTMENT       WP9422   A PROCEDURE FOR DETERMININ                             VESTIGATED IN
INVISCID         MW4124   A MOMENTUM* ANALYSIS                                   RSONIC-FLOW*
```




```
PUB-6            WP9249(C)  PROPOSED REVISIO                    6 -CURRENT-SITUATIONS-TEAM
PUBLIC           MW3625   THE SYSTEMS APPROACH                  -QUADE,E.S.  SYSTEMS-ANALYSIS*
PUBLIC           MW3739   REVIEW OF PUBLIC POLI                 EXAMINED BY YEHEZKEL DROW, CHANDLER
PUBLIC           MW3741   PPB & THE PUBLIC POLIC                NG* SYSTEM: SOME REFLECTIONS ON THE PAPERS
PUBLIC           MW3893A  PRIVATE AND PUBLIC SECTORS -SMITH.K.V. INVESTMENTS* ECONOMICS*
PUBLIC           MW4230   DIRECTED RESEARCH CENTERS AND PUBLIC PROBLEMS -ALESCH.D.J.
PUBLIC           MW4312   BACKGROUND OF PUBLIC SYSTEMS MANAGEMENT -NOVICK.D. BUDGETING*
PUBLIC           MW7134   PUBLIC FACILITIES AND SERVICES INVENTORY QUESTIONAIRS* PUBLIC-FACILITIE*
PUBLIC           MW7461   AIR-FORCE FILM DIRECTORY: DIRECTORY OF AF FILMS: CLEARED FOR PUBLIC AND
PUBLIC           MW7806   STRATEGY & ORGANIZATION IN PUBLIC LAND POLICY -HALL.G.R. *RAND :P-3403
PUBLIC           MW7893   SECT-3A ECONOMIC-DEVELOPMENT*SECTION-3.  PUBLIC INVESTMENT & REGIONAL
PUBLIC           M70-2    A PROPOSED PROJECT-PLAN FOR A PUBLIC VEHICLE RENTAL-SYSTEM -MARINO.J.J.
PUBLIC           WP1192   DRAFT FUNCTIONAL REQUIREMENTS OF A PUBLIC AUTOMOBILE RENTAL SYSTEM
PUBLICATIONS     MW3978   PUBLICATIONS OF THE LOGISTICS DEPARTMENT -GRUSKY.J. -SCHNEIDER.R.ED.
```

FIGURE 11

MULTIPLE-TERM SUBJECT SEARCH

that all terms be present. It used what is called AND logic (this term AND that term AND some other term must all be present). OR searches (this term OR that term, etc.) may also be constructed by the user. For these, the accession number list obtained under any term is added to the list under the other terms. Multiple term searches may be performed using any number of terms, combining them in any manner desired. Careful use of this method and careful "jotting" of the list can save a lot of time in looking for reports in common subject areas.

The Library indexer has developed a technique for speeding up multiple term searches by providing some pre-coordination of index terms. This is done by linking index terms with hyphens. The title, "THE UNIFORM DATA ELEMENT DESCRIPTION," for example, is indexed by standard KWOC techniques under UNIFORM, DATA, ELEMENT, and DESCRIPTION. The indexer, in the improved procedure, enriches the input by entering the additional term DATA-ELEMENT*. This type of linking is also used to hold together the sets of character strings which make up the full name of the corporate source: (for example: *SOCIETY-OF-AUTOMOTIVE-ENGINEERS). Multiple term searches of the index can be made more quickly when the searcher can enter the index looking for the complete term, DATA-ELEMENT*, in one place rather than having to coordinate all of the entries for DATA with all of the entries for ELEMENT.

Retrieving Information

The KWOC Index can also be used to retrieve information. For example, staff members can obtain a list of all the documents they have published by looking in the author section of the KWOC listing. See Figure 12. A KWOC user interested in seeing what type of reports we have been getting from RAND recently can look under the RAND entry in the Corporate Source section of the listing. The user, usually with the help of the Library staff, can also prepare bibliographies on any single term or any combination of terms. All of the information required can be obtained from the index without retrieving the actual reports.

The possibilities for information retrieval from KWOC are limited only by the imagination of the user and the time available to search for and compile the information.

```
NEALEY.S                 MW3999  LEADERSHIP FUNCTIONS OF MIDDLE MANAGERS -NEALEY.S -FIELDER.F.
NEBYLITSYN.V.D.          MW3993A AUTOMATED SYSTEMS -NEBYLITSYN.V.D. MAN/MACHINE-INTERACTION*
NEELY.R.B.               MW3998  CONTEXTUAL ANALYSIS OF PHONEMES OF ENGLISH -REDDY.D.R. -NEELY.R.B.
NEHAM.E.A.               MW7466A AMPHIBIOUS OPERATIONS - AN AUTOMATED CAPABILITY -NEHAM.E.A. /680300
NEHAM.E.A.               MW7470A OPERATION: AN AUTOMATED CAPABILITY -ROHRBACHER.W. -NEHAM.E.A.
NELSON.A.C.JR.ETAL.      MW3174B -NELSON.A.C.JR.ETAL. COMPUTERS* COMPUTER-PERFORMANCE* /670000 =AD829354
NELSON.R.T.              MW3966A -NELSON.R.T. /690200 *WESTERN-MGT-SCI-INST-LOS-ANGELES-CALIF-UNIV
NERADKA.V.ETAL.          MW7305  HYPERVELOCITY JET DRIVER STUDY. FINAL-RPT -NERADKA.V.ETAL. CONSTRUCTION*
NETZER.D                 MW7192A GOVERNMENT FINANCE(S)* -NETZER.D LAW* BUDGETS* /680000
NEWBERGER.E.G.           MTR4117 COMPUTER DISPLAY CHANNEL SIZING -NEWBERGER.E.G. CDC*
NICHOLLS.J.              WP9351(S)A DAMAGE ASSESSMENT SYSTEM 1972 -NICHOLLS.J. .D-30 /671222 $31.1.5
NICHOLS.B.E.             MW4000A ORBIT -NICHOLS.B.E. -WARD.W.W. COMMUNICATIONS-SATELLITE*
NIELSEN.G.               MW7276  OPTIMAL DESIGN OF LINEAR SINGLE VARIABLE SYSTEMS -NIELSEN.G. CALCULUS*
NIXON.C.W.               MW7376  HUMAN AUDITORY RESPONSE TO AN AIR BAG INFLATION NOISE -NIXON.C.W.
NOBEL.B.                 MW4206  COMPLEMENTARY VARIATIONAL PRINCIPLES-II: NONLINEAR NETWORKS -NOBEL.B.
NOVICK.D.                MW3575  LONG-RANGE PLANNING THROUGH PROGRAM-BUDGETING* -NOVICK.D. ECONOMICS*
OBERBECK.T.E.            MW3173A NEW MEXICO 11-12-OCTOBER-1967 -MARTINA.J.P. -OBERBECK.T.E. RESEARCH*
OBRIEN.W.M.              MW3210  APPROACH FOR CHANGE JOVIAL EVALUATION PROJECT -OBRIEN.W.M. COMPUTERS*
OLSEN.E.O.               MW7606A -OLSEN.E.O. /691200 *RAND :P-4258 =AD698143
OSULLIVAN.D.F.           WP7141A SESSION AT OAKLAND 2/4 THRU 2/6/70 -OSULLIVAN.D.F. TRANSPORTATION*
OTTEN.D.D.               MW3121A SATELLITES* INTERIM-RPT VOL-1 SUMMARY -OTTEN.D.D. SATELLITE-NAVIGATION*
OUELLETTE.R.P.           WP7169A -BURTON.J.S. -HOFFMAN.L. -OUELLETTE.R.P. /700413 COAL* AIR-POLLUTION*
PAO.C.V.                 MW7260A APPLICATIONS -PAO.C.V. -VOGT.W.G. DIFFERENTIAL-EQUATIONS* NONLINEARITY*
PARSONS.T.M.             WP9305  EXPLAN-2 DATA PREPARATION GUIDE -PARSONS.T.M. .D-30 /670918 $31.5.1
PASCAL.A.H.              MW7615  CRITERIA FOR THE LOCATION OF FEDERAL REGIONAL FACILITIES -PASCAL.A.H.
PATTERSON.J.G.           MW3226  MANAGING THE DATA PROCESSING OPERATION -PATTERSON.J.G. -STERNER.E.J.
PECORA.W.T.              MW7463  GEOLOGIC APPLICATIONS OF EARTH ORBITAL SATELLITES* -PECORA.W.T.
PETERSON.P.L.            MW3806C COMPUTERS -PETERSON.P.L. -CARNES.R. -REID.I. PROGRAMMING-LANGUAGES*
PETTIBONE.R.             MTR5005(TS)C -WATSON.J.W. -BEE.R.W. -ARCHINAL.W. -PETTIBONE.R. .D-31 /660117
PFEFFERKORN              WP3970(TS)A -PFEFFERKORN .D-03 /691231 $83.8.0
PFEIFFER.C.G.ETAL.       MW7332A -PFEIFFER.C.G.ETAL. ESTIMATING* SEQUENTIAL-ANALYSIS*
PIERCE.E.T.              MW7410  THE COUNTING OF LIGHTNING* FLASHES -PIERCE.E.T. RADIO-TRANSMISSION*
POLIS.R.I.               WP9313(C)  SUMMARY OF THE COACT OPREP REPORT WORKING CONFERENCE -POLIS.R.I.
POLIS.R.I.               WP9565VOL1A INPUT PROCESSING SYSTEM -POLIS.R.I. AUTOMATION* /700316 .D-31
PONDER.L.W.              MW7392LB -PONDER.L.W. NMCSSC* SASM* /680715 :TM-32-68 =AD845652L
POORE.J.H.JR.            MW7185  A SURVEY OF DISPLAY HARDWARE AND SOFTWARE -POORE.J.H.JR. -DAVIDOW.J.E
QUADE.E.S.               MW3625  THE SYSTEMS APPROACH AND PUBLIC POLICY -QUADE.E.S. SYSTEMS-ANALYSIS*
QUINN.R.D.               MW7538A AIRPLANE -BANNER.R.D. -KUHL.A.E. -QUINN.R.D.
```


FIGURE 12
AUTHOR SEARCH

SECTION IV

A PROGRAMMER'S OVERVIEW OF KWOC

Brief program descriptions and some comments on special features are given in this section. Full supporting documentation (flow charts, program and procedure listings) is given in Appendix IV, Programmer's Handbook for KWOC.

Basic Programs

The system is based on use of three programs run on the IBM 360/50 in a multi-programming mode under OS 360, Version 18 with HASP (Houston Automatic Spooling Processor, an I/O expediting feature). Detailed flow charts of all programs are contained in Appendix IV. Listings are presented in Appendix V.

The first program, KWOC1, written in assembly language: reads input cards; identifies character strings of two characters or more; compares these strings against stop list terms: and if the string is not on the list (and is, therefore, a KWOC keyword), creates an index for the string. These records are in the same format as the print line. Each record, in fact, is one full line of the output. The KWOC indexing program requires approximately 300 instructions. It presently contains the 400-word stop list suggested by Williams in his book.* The full program, when link-edited, requires 46k bytes.

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*W. F. Williams, Principles of Automated Information Retrieval, The Business Press, Elmhurst, Ill., 1965, pp. 126-129.

The output of KWOC1 is sorted by the Sort-Merge utilities called by Job Control Language (JCL) statements. Records are sorted on the first 40 characters. This includes the keyword field and the first 17 characters of the context field.

The basic print procedure uses the Tape-To-Print utility called by JCL. A slightly more sophisticated assembly language print program has been written. This program, KWOC2, reads the sorted output of KWOC1; deletes records containing certain tags, if suppression of those records is desired; deletes tags from the keyword fields; and prints using normal pagination controls. This program, when link-edited, requires 48k bytes.

These three programs are used to prepare and check the newly indexed material weekly. After checking, newly indexed records are accumulated and, once a month, inserted into the master file with the Sort-Merge utility under JCL. The master file is printed periodically with KWOC2.

Special Features

1. Character string separators - any number of blanks, up to four, or a comma are interpreted as a break in the input character string. Each string of characters between such separators is considered a potential keyword to be checked against the stop list. More than four blanks separating character strings are interpreted as the end of the text on the card.

2. Stop List - this presently consists of a table of 400 common words not useful for indexing. It is possible to extend this list (or shorten it) by altering the table in the program. No term included in the list will be used as an index term by the KWOC program. In addition to terms on the Stop List all single character strings are omitted from indexing.

3. KWOC1 Output record format - this currently appears as follows:

Character Position

1-20	21-23	24--------104	105-125
Keyword	Space	Context	Space

Field

The output of the print program is as follows:

Character Position

1-20	21-23	24------104	105-111
Keyword	Space	Context	Space

Field

There is nc requirement for the extra space at the end of the records and no significance to the different lengths.

4. Program-assigned prefix for accession numbers - So that the library accession numbers will all fall together and come first in the sort sequence, the program prefixes them with a special "character". This "character", hexadecimal 00, is lower in the

EBCDIC collating sequence then blank (hexadecimal 40) or the first printable character, the ¢ sign, hexadecimal 4A.

5. Prefix Change for Corporate Source entries - An initial colon is replaced with an equal sign under program control so the report numbers and Clearinghouse/DDC numbers will be sorted together.

6. Sort Procedure (Job Control Language Statements) - The output records from KWOC1 are sorted by the sort-merge utilities in a single alphabetic disk sort on the first 40 characters. Six work areas are used. The output from the sort step consists of a set of ordered records that can be output on magnetic tape for retention or stored temporarily on disk and used as input to the print programs. Because of the special alpha "tags" for the various data elements, each set of related records is sorted together even though only one sort is used.

7. Basic Print Procedure (Job Control Language Statements) - The basic print procedure uses the "tape to print" utility. It reads records from the sorted output and prints them, single spaced, on the line printer. It is useful for checking over the coded input for the updating cycle. It performs no character manipulation. It skips to a new page only on a print overflow condition.

8. KWOC2, a More Sophisticated Print Program - This program contains several special printing features which are used to improve the readability of the output. These features are:

a. Page change - page changes occur on print overflow and on changes in initial character, when the initial character is one of the special character prefixes. No carriage control characters are used in the process.

b. Prefix deletion - blank is substituted for all initial special characters in the output records. This is done only for special characters below A in the collating sequence. The substitution is performed just prior to printing.

c. Section deletion - complete segments of the output may be omitted from the printing by user request. The KWOC2 input parameter card provides a space to list prefix characters. No output record containing the prefix characters specified in that field on the parameter card will be printed. For example, putting a hyphen and a slash (the characters used as prefix for author and date) in the parameter card field will cause the author and the date listing segments to be omitted.

d. Dating of Output - the date shown on the KWOC2 input parameter card is reproduced at the beginning of each listing segment. It is emitted along with the first line after each page change caused by an initial special character change.

9. Holding of old input decks - at present all input cards are retained in an archive file. The lack of a selective retrieval program makes this necessary. In order to produce a listing of any subset of the master file (i.e., The Division 3 documents) it would be necessary to use the input cards and create a new, special master file containing only Division 3 document index records. Printing this would provide the desired output.

10. Retiring of Old KWOCs - from time to time the size of the output listing will cause excessively long running times. At this point it will be necessary to retire certain records from the master file. At present it is planned to retire old KWOC records a year at a time. The number of years' worth while being retained in the active file is not yet set but will be at least one and perhaps as high as three. For older records one will have to search year by year through earlier KWOCs.

System Limitations

1. No provision has been made in the system for master file maintenance. Records entered into the master file cannot, with present KWOC programs, be changed. This requires a high level of quality control on input. It is the primary reason for having the Library staff scan the cumulative weekly listings carefully to spot the need for corrections in input cards.

2. The system provides no capability for automatic retrieval from the master file. All retrieval is performed manually using the listings of the master file and the cumulative updates.

3. The number of cards which may be input at any one time is limited to approximately 2,000. The sort programs are currently set to use 50 contiguous disk tracks for each of six sort work areas. Assuming the average number of index records generated from each card is about 6, then 2,000 cards of input will produce about 12,000 records of 125 characters each, a total of 1,500,000 characters. The six areas of 50 tracks will hold 1,875,000 characters at the blocking factor of 50 records per block used by KWOC. The difference between the capability of the work areas and the amount specified as the limit for input is "insurance."

If necessary, the number of tracks can be increased to 75 or more with only a small JCL change.

SECTION V

KWOC ECOLOGY

There are several features of the KWOC index as implemented in the Washington Library which are vital to its continued effective operation. These are:

(1) It is guardedly responsive, providing the best quality report indexing service available to meet the requirements within the resource limitations imposed.

(2) It is very inexpensive to operate.

(3) It contains timely information.

(4) It is fully documented.

A number of hidden physio-socio-psychological threats to the current health and vigor of the system exist, however. In order to assure the continued usefulness of the KWOC index care must be exercised by all involved not to let these hidden threats surface to infect KWOC with a crippling illness. A few of the major threats to be avoided are described briefly below.

The "left-in-the-sponge" syndrome often infects KWOC makers. One can always discover some little change that could be made to correct an error that got by last month or to improve the logic flow of the program. These changes require modifying the program and, once that has been started, one can always think of a few more "nice to have" capabilities (see "go-go-itis" below) and so on ad infinitum. Programming and debugging are the most expensive parts of the KWOC development. Re-programming opens up many uncertainties,

causes extra shake-down runs and destroys the validity of the documentation. It takes courage to wait it out, but the minor problems, like the surgeon's sponge, either melt away or pass some other way into oblivion.

The "go-go-itis" virus is also contagious in the creative environment at MITRE. Programmers' pulse rates rise dramatically when they dream of all that delightful library data just sitting around in the KWOC files and what they could do with it. Hallucinations of on-line querying from desk top CRTs and instant responses pop into mind. No certain cure has been found for this yet; however, massive doses of "see what you can do with just the plain old listing" while bitter to the taste, have proven effective in many cases.

The "aching backlog" is perhaps the most insidious illness which can befall the KWOC index. It is allegedly the cause of the paralysis of the prior system, Its onset is caused by a variety of agents including: "higher" priorities; set-aside-itis and; too-many-on-today's-batch-to-do-osis. Failure to process into the KWOC index each day the information about the reports that arrive each day can cause a growing numbness of the system. Existence of any backlog means that the most recently acquired reports are not included in the listings. It is often these most recent which are the most useful to the staff. It is easy to maintain throughput in the system by injecting transfusions of extra help when it is required.

The last item which must be mentioned is "documentation aphasia." With the publication of this document all users of the KWOC index have one central place to look for information about its use. Despite the warnings, imprecations and bald threats from the system developers (who we will soon discover were not as omniscient as we had thought) some changes to the KWOC system will eventually be made. Some of these will be made to adjust to new requirements or new resource situations, others will just be because "we prefer to do it that way - and it doesn't make any difference does it?." Whatever the reason for the change, it must be documented. If changes are not documented sudden heart failure may result some day when the whole system shuts down because the person who was keeping track of all the changes stays home ill or is otherwise unavailable. A well placed innoculation with a recording needle is the remedy for the problem. All who change anything about the system or any of its procedures must have the remedy applied promptly. Thus infused with the desire to record their change, they will send their information to:

Miss Paula Strain

MITRE Washington Library

ERIC User Please Note:

Appendix I Is not reproduced here.

Appendix I included in the original document consisted of a section on Indexing from the copyrighted publication Textbook on Mechanized Information Retrieval by Allen Kent, N.Y., Interscience Publishers, 1962, pp. 84-90.

ERIC/CLIS

APPENDIX II

REFERENCE DATA FOR CODING KWOC INPUT

Accession Number

- The first notation made on each input card, starting in card column 1, will be the report accession number.

- A card sequence letter will be suffixed to the accession number on all cards after the first card. These will start with A and, on succeeding cards letters B, C, D, etc. will be used as required. No letter beyond Q in the alphabet will be used for card sequencing.

- In accessioning MITRE-generated documents or others which have volumes, series, revisions, etc. in the accession number, use the following abbreviations (without punctuation):

V ... Volume

S ... Series

R ... Revision

SP ... Supplement

X ... Correction

An example: WP1234V1S2R1SP3X2

WP1234V1S2R1SP3X2A

B

.

.

.

- The Technical Reports Section of the Library and Document Control Department will assign different numbers to the different volumes or supplements of a report from another agency than MITRE (i.e., one accession number to each volume or part). MITRE-generated documents will continue to use their own report number as an accessions number in the Library. In cases where the number runs beyond 19 characters or there is other difficulty, the Technical Reports Staff will consult Miss Strain so that a consistent policy for the Library can be developed.

- The Technical Reports Section will use the control numbers assigned by Document Control Department for classified documents rather than reaccessioning them with a new number. The acronym for the issuing agency, which Document Control uses as the first part of the control number will, in the Library entry, be filed after the control number, rather than before, for a more meaningful sort by the computer.

- Classified reports will show the classification symbol in parentheses, as part of the accession number character string after the card sequence letter.

Examples:

W1234/RAC(C)

WP1279(S)

Title

- The report title will be coded immediately after the accession number character string, starting on the first card.

- Code just as in document, with minimal modifications.

- If a word in the title is also assigned as an index term, the word in the title is coded with an asterisk following it.

Example:

A STUDY OF URBANIZATION* IN THE UNITED-STATES, PART-II

URBANIZATION* is an index term as well as a title keyword.

UNITED-STATES is hyphenated to prevent generation of separate listings for both words.

PART 2 is coded as PART- 2 to prevent separate listings of "PART" and " 2."

- Terms in the title within quotation marks or inside parentheses will be coded with the left-most quotation mark or parenthesis omitted in order to avoid listing under (in the sort sequence.

Example:

GROWTH OF URBANIZATION (URBGRO) IN "DISNEYLAND EAST"

would be coded:

GROWTH OF URBANIZATION URBGRO) IN DISNEYLAND EAST"

- Normally, terms in titles will not be abbreviated. Where abbreviation is desired, only abbreviations from the Library Clerk's list of acceptable abbreviations will be used. This list is kept in her KWOC notebook.

Author

- Each author's name is coded, with a dash preceding the first letter of the last name. Initials only follow the last name. No given names are spelled out. They are connected to the last name by periods so that the character-string is treated as a single group. Junior or III are added to the name entry after the last name and before the initials, only for authors of MITRE Papers. No titles are coded.

Example:

-HENDERSON.D.D. -MAISH.A.M. -MORAN.C.V.-PETTIBONE.JR.R.O.

If the document lists a single author with ET AL rather than a number of names, ETAL is used.

Example:

-FLURY.W.R.ETAL

A group author like SASM SUPPORT GROUP is coded as a single group with hyphens as connectors.

Example:

-SASM-SUPPORT-GROUP

Index Terms

- Index terms are coded with an asterisk directly following the last letter.

COMPUTERS* PROGRAMMING*

COMPUTER-PROGRAMMING*

PROGRAMMING-LANGUAGES*

Date

- Coded as last two digits of year, month number, and day, preceded by a slash /

(YYMMDD)

30 December 1969 is /691230

(with no blanks between characters)

MITRE Department

- Indicate Department by .D or .C followed by hyphen followed by Department number in two digits.

.D-02

.D-24

.C-70

MITRE Project Number

- Project/Task number preceded by percent sign

%31.5.0

- DCA Program Line Item (PLI) numbers are appended to the Task number by a slash /

%31.5.0/20601.1234A

AD Number, also
NASA and CFSTI Numbers

- Preceded by = sign. No embedded blanks or commas

=AD896543 =N70-14321 =PB170246

Corporate Report Number

- Preceded by colon: No embedded blanks or commas

:JWGA-100-54

Corporate Source

- Preceded by * linked by - if required

*RAND

*ARMY-AUTOMOTIVE-COMMAND

- Abbreviations are being used for certain corporate sources whose reports make up a large number of entries in the collection. The complete list of corporate source conventions is maintained by the Library Aide in her KWOC notebook.

APPENDIX III

RUN PROCEDURES

Monthly Run Procedure (May be run less frequently)

- On Thursday afternoon take the most recent week's input cards just returned from keypunch and submit them to the Computer Center as a job with the CHECKOUT procedure. (This is the same as the weekly run procedure but is run with only one week's input.) See Figure III-1 for deck setup.

- Friday morning: get the CHECKOUT output listing. Make the corrections to the cards, and then put them in the deck with all the other cards from the past three weeks. This has to be done by 5:00 p.m. Friday because computer time is allotted for the run on Sunday night. Do not add any new cards after finding the ones that need correction. Any late keypunching must await the next week's run.

- Submit the data cards with the appropriate control cards for the multistep job CUMULIST, JOB 1 of 2. (See Figure III-2.) You have to specify on the Job Request Card that output must be suitable for reproduction.

The entries in columns 21-26 will cause suppression of any of the portions of the listing related to contract number, Department, Corporate Source, Date, Project, Corporate Report No. and AD No. Only the basic bibliographic entry, the author listing, and the subject index will be printed.

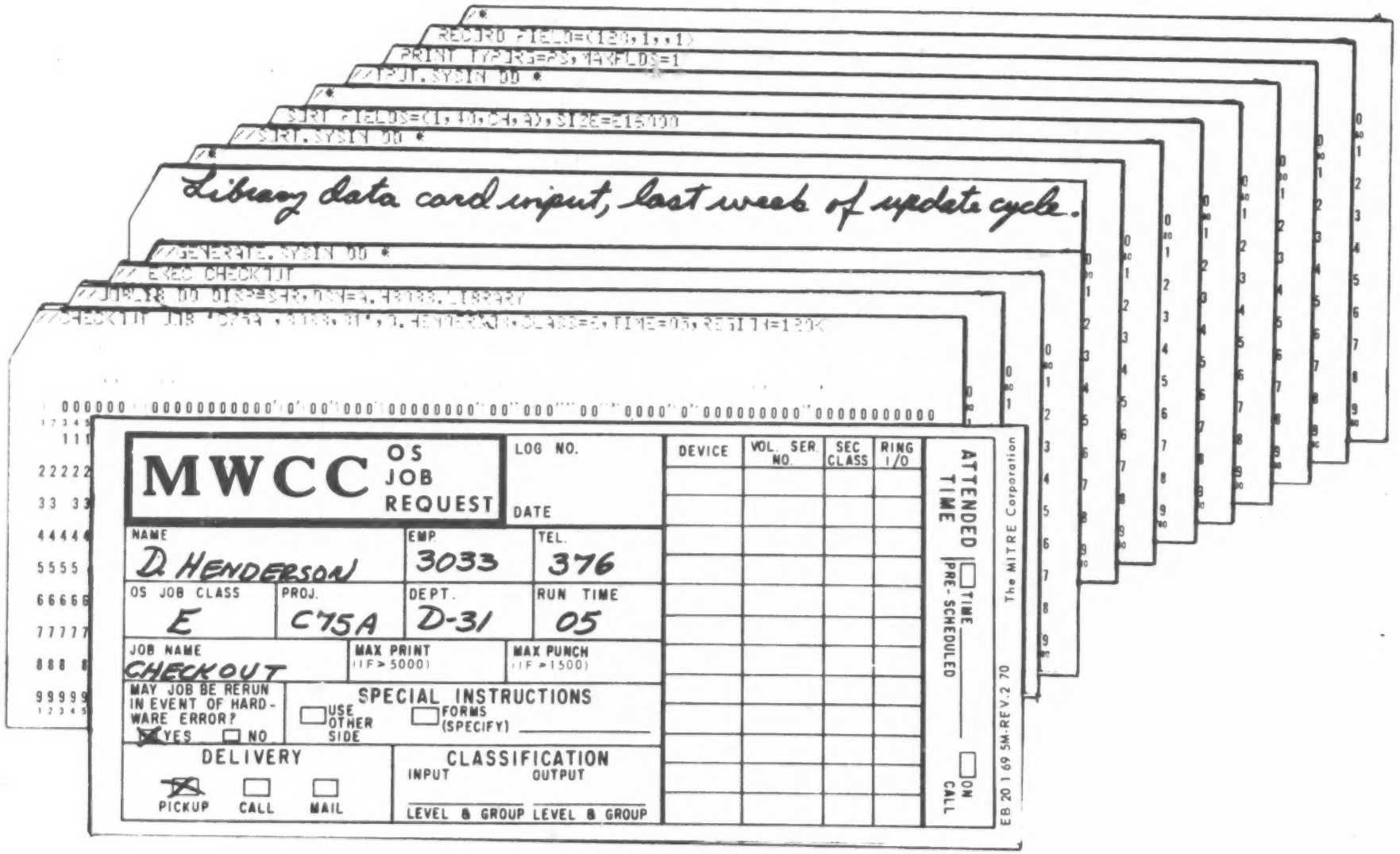


FIGURE III-1
CHECKOUT PROCEDURE INPUT

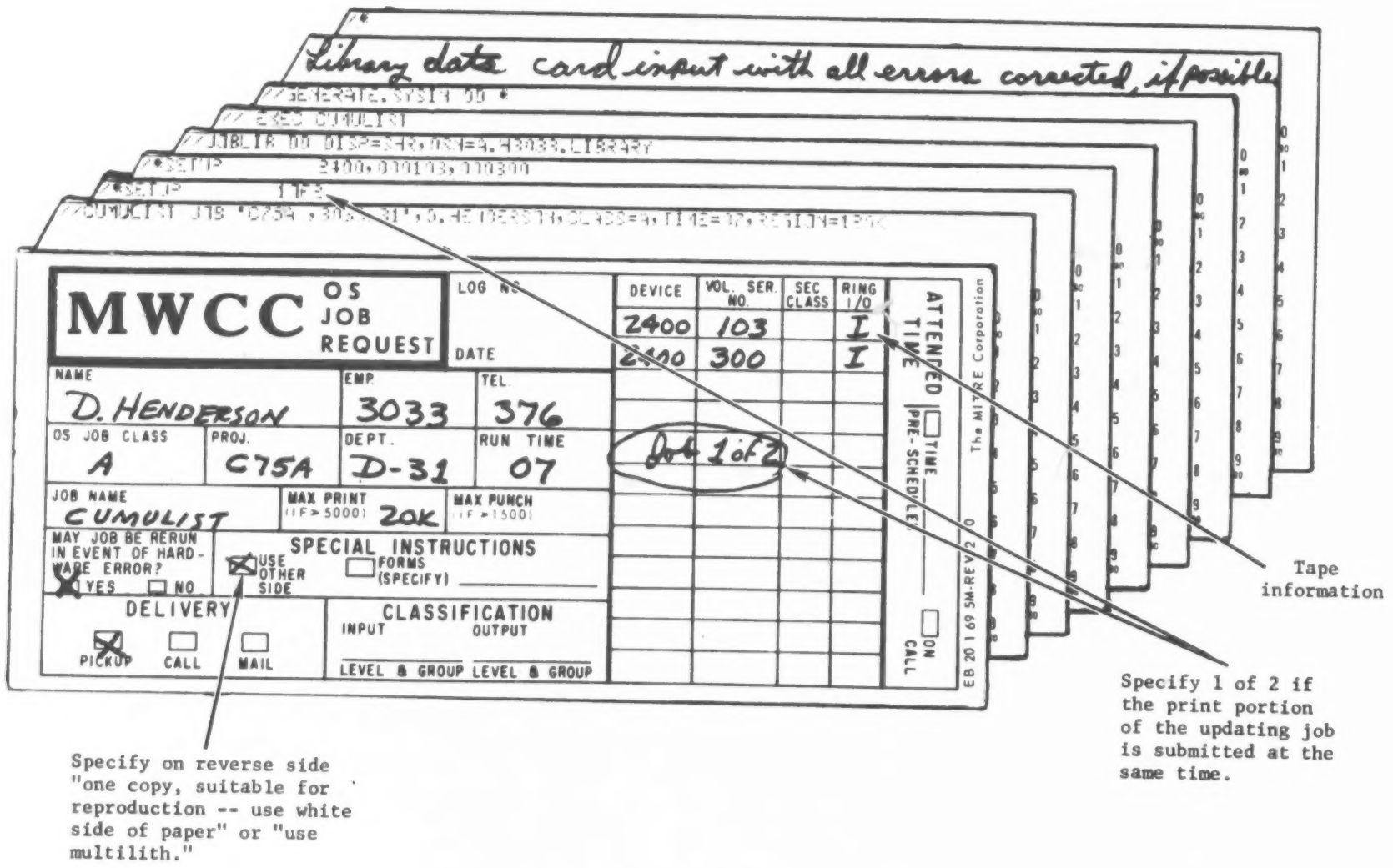


FIGURE III-2
CUMULIST PROCEDURE

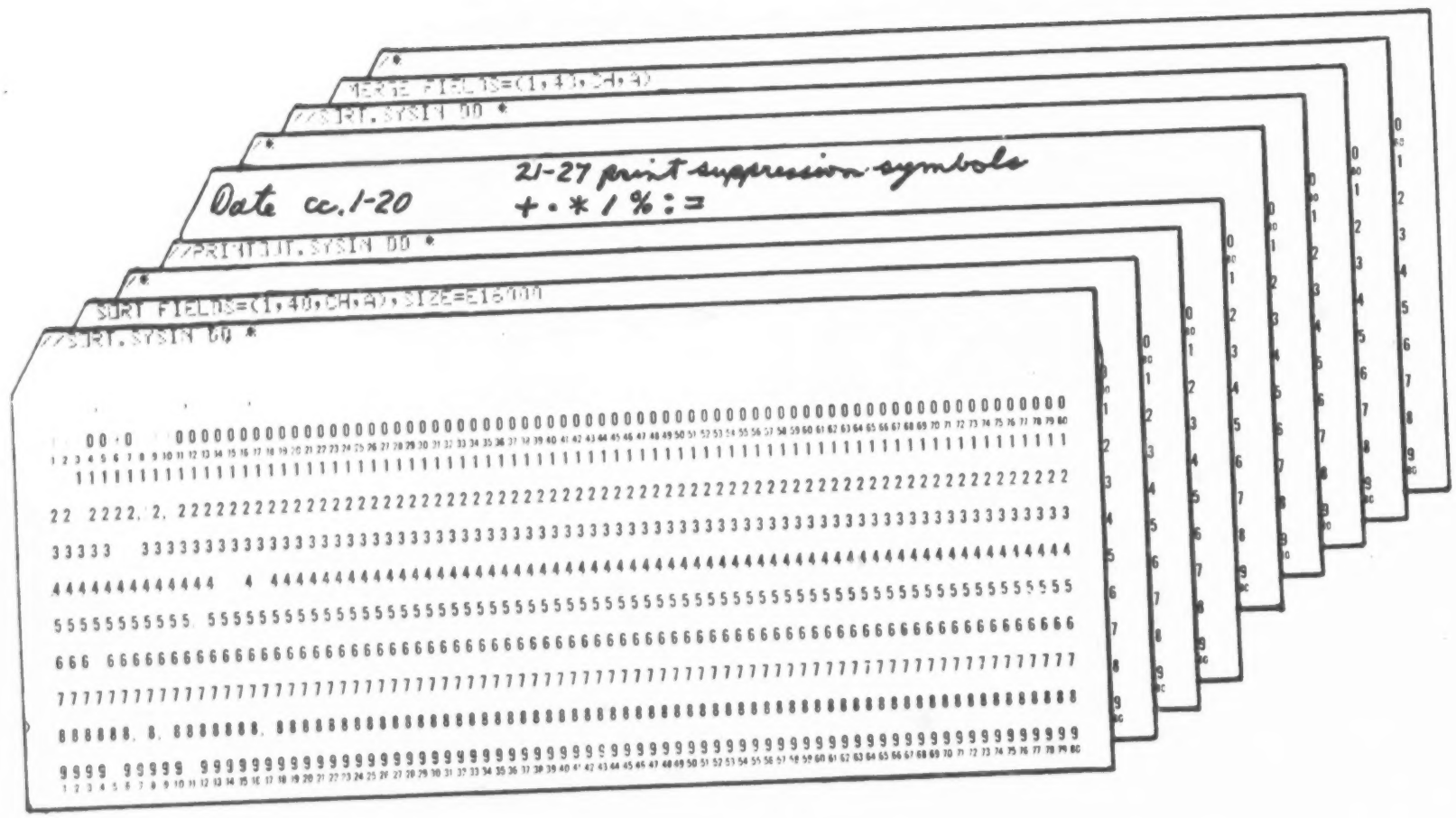


FIGURE III-2 (CONT'D)
CUMULIST PROCEDURE

The "suppress" control card for the print program in this run is keypunched as follows:

Columns 1-20, date desired on printout; e.g., 31 March 1971

Column 21 +

Column 22 .

Column 23 *

Column 24 /

Column 25 %

Column 26 :

Column 27 =

Be sure to specify on the Job Request that the printing is to be reproduced. If more than one copy is desired, specify "Repeat Print." This output is the monthly Accessions List.

- For JOB 2, PRINT, which is run immediately behind JOB 1, the control card contains the usual information and the extra notations "To be printed on striped paper" and "Repeat Print 3 copies." The output of this run is the KWOC listing which is put out for users in the Library. See Figure III-3 for input deck setup. The control card for JOB 2 is keypunched as follows:

Columns 1-20 contain the date desired on printout

Column 21 +

All other columns are left blank. The + in column 21 will cause the contract number portion of the listing to be suppressed. (Column 21 is the only column currently used.)

Weekly Run Procedure

- Monday through Thursday: code input data for all the accessions in one week; get the data keypunched, a few sheets at a time, so it is done by Thursday afternoon. Also, correct previous week's data cards on Monday.

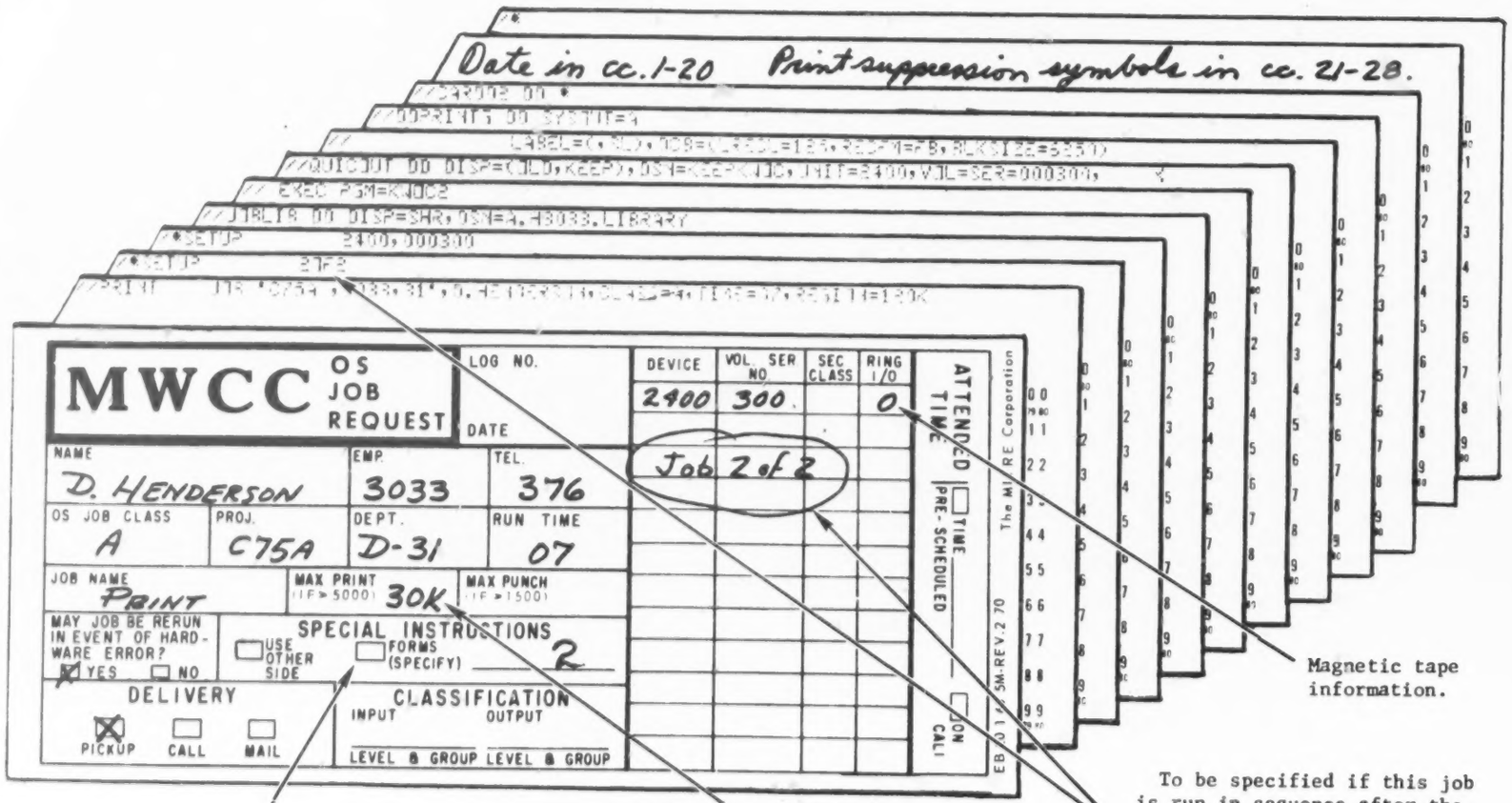


FIGURE III-3
PRINT JOB INPUT

- Monday: have the cards sorted alphabetically on columns 7-1 so that the corrections can be made easily.

- Friday afternoon: submitthe computer job, with request card and control cards for the procedure called WEEKLY; computer time is reserved for Sunday night/Monday morning (See Figure III-4 for the job deck setup). The "suppress" control card is keypunched as follows:

Columns 1-20, Date (enter in numeric form or with months spelled out).

Column 21, = sign to suppress printing of contract number listing.

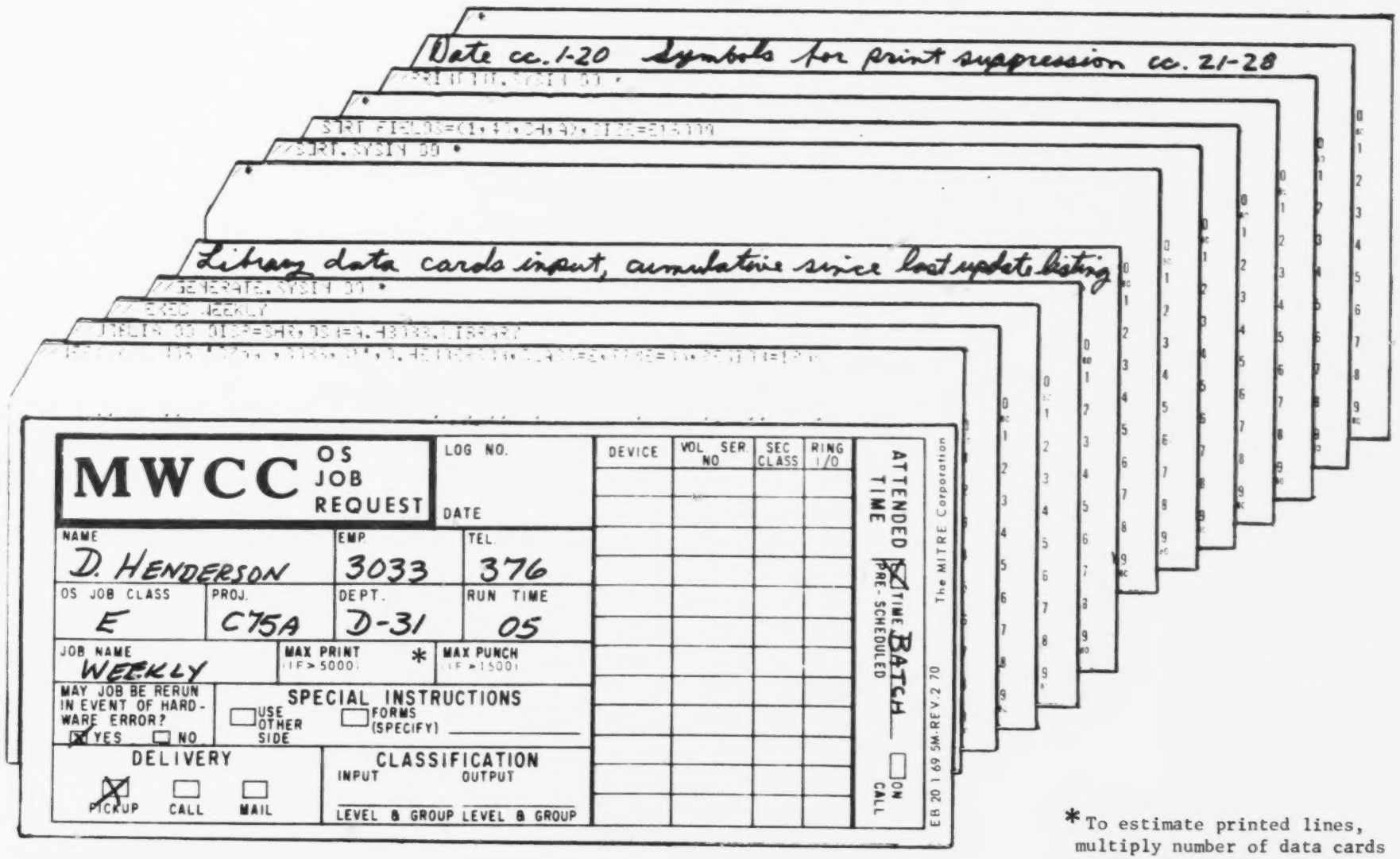
Columns 22-28, other characters that designate parts of the listing you want to suppress (Examples: colon to suppress corporate report number, period to suppress department number).

- Monday morning: pick up the weekly cumulative acquisition print-out listings. Check them for coding errors. Make a list of corrections.

- Put the new listings out for library use by noon Monday.

- Make keypunch corrections to cards and examine them to make sure the punches are not "off gauge." Duplicating on the keypunch sometimes introduces punching position of alignment errors into cards that were previously all right. Insert corrections into the deck and hold them for the next weekly run. The corrected cards will appear in the following week's run.

- Second and third week, add new punched cards to the back of deck after they have been sorted together, alphabetically, on columns 7 through 1. The sorting is for convenience in finding the cards that



66

* To estimate printed lines, multiply number of data cards by 10 and add 100. If the number is > 5000, specify the larger number.

FIGURE III-4
WEEKLY PROCEDURE INPUT

need correction. There is no program requirement for the cards to be in order. DO NOT leave Job Control cards in the data card deck when the deck is sorted.

APPENDIX IV

PROGRAM FLOW CHARTS

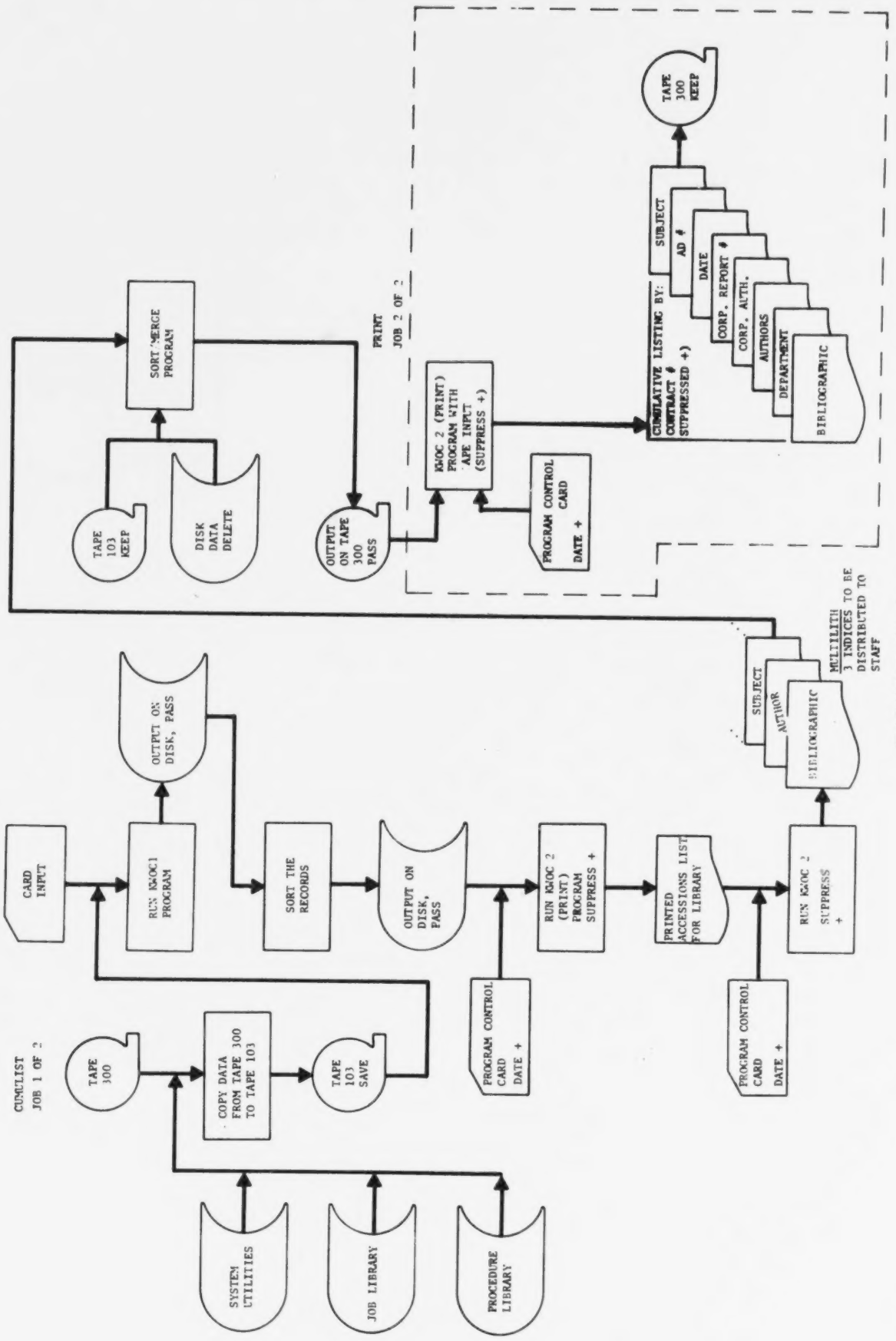


FIGURE IV-1
PROCEDURE FLOW CHART FOR CUMULIST AND PRINT JOB

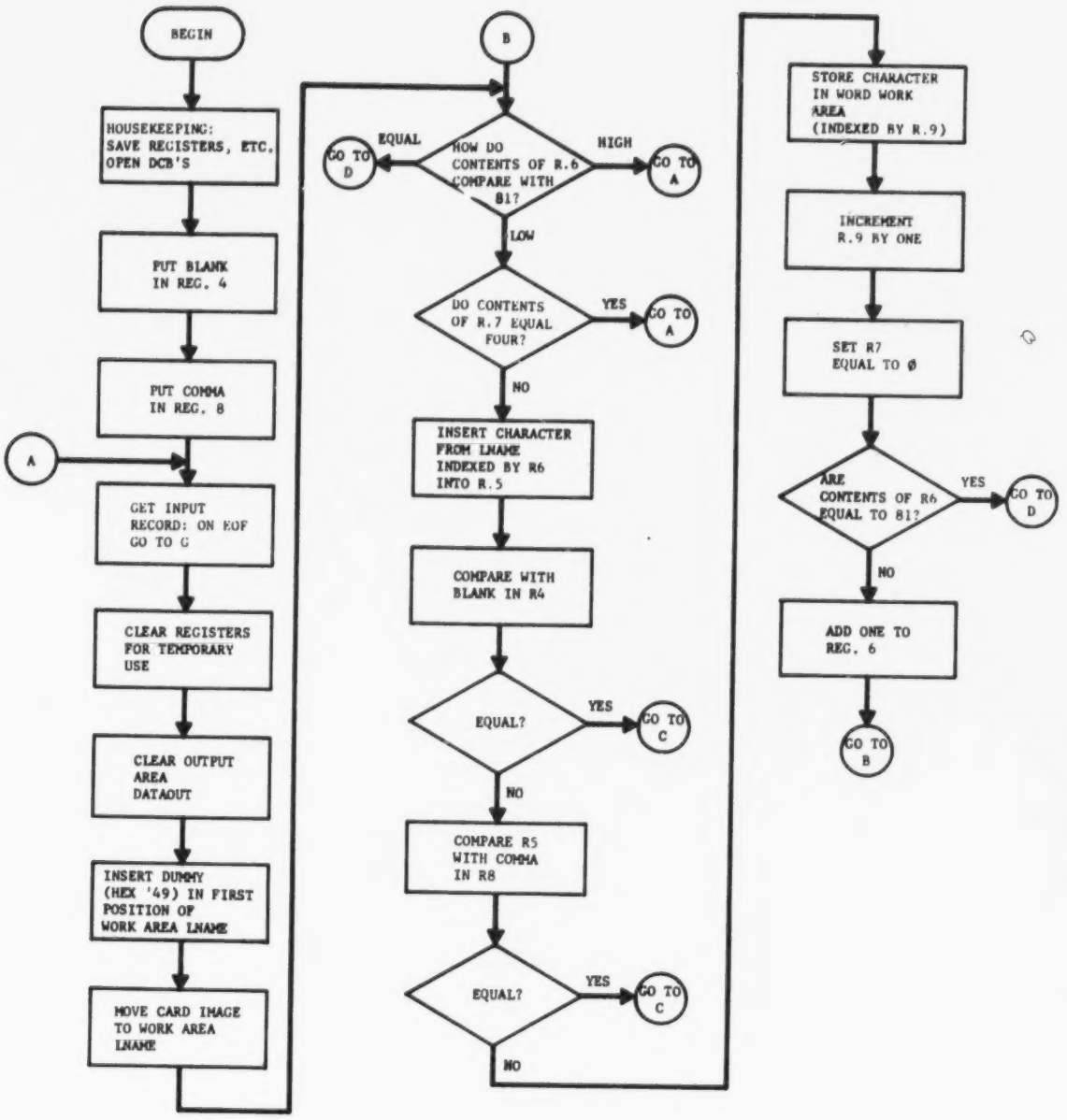


FIGURE IV-2
PROGRAM FLOW CHART FOR KWOC I

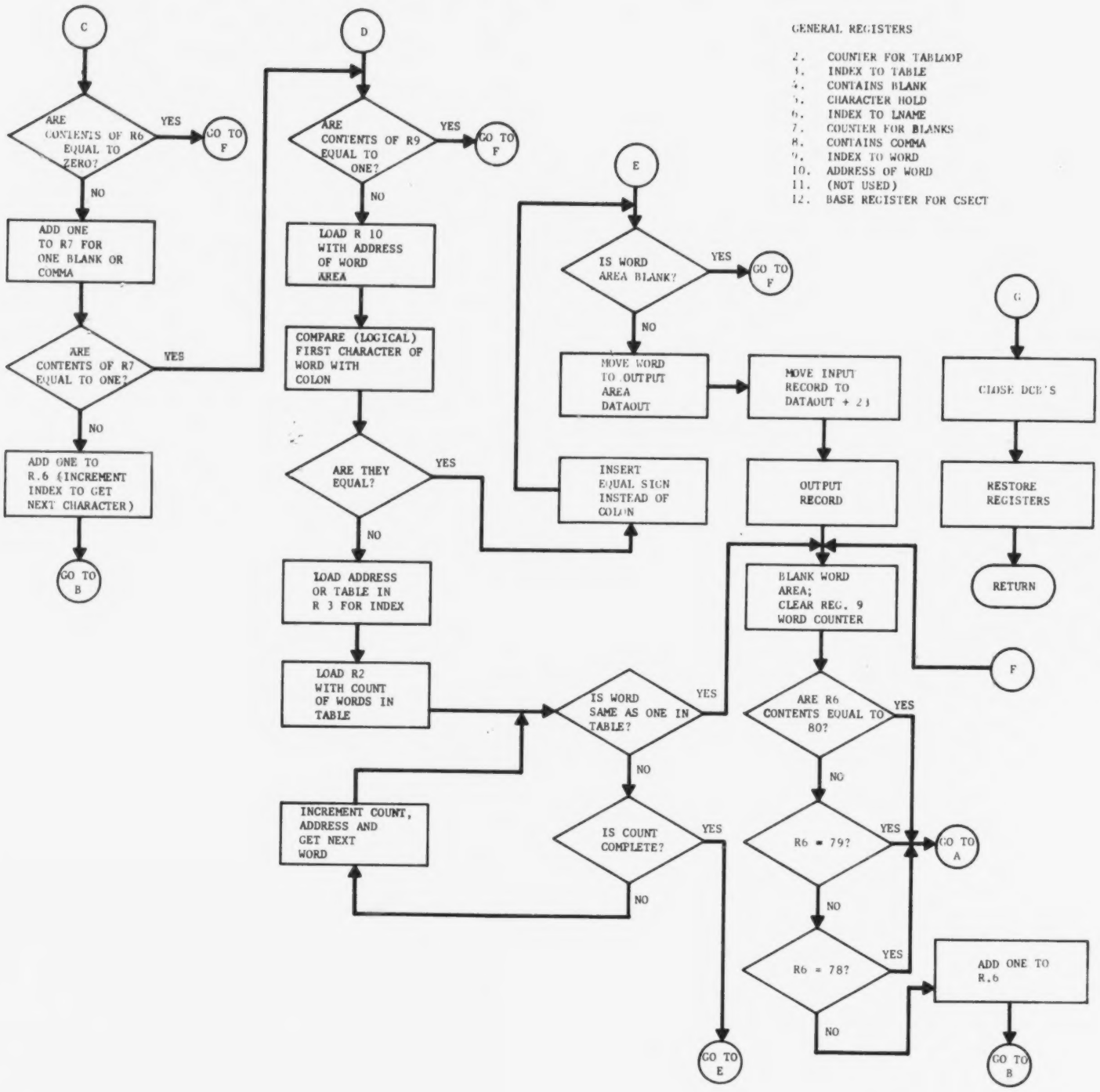


FIGURE IV-2 (CONT'D)
PROGRAM FLOW CHART FOR KWOC I

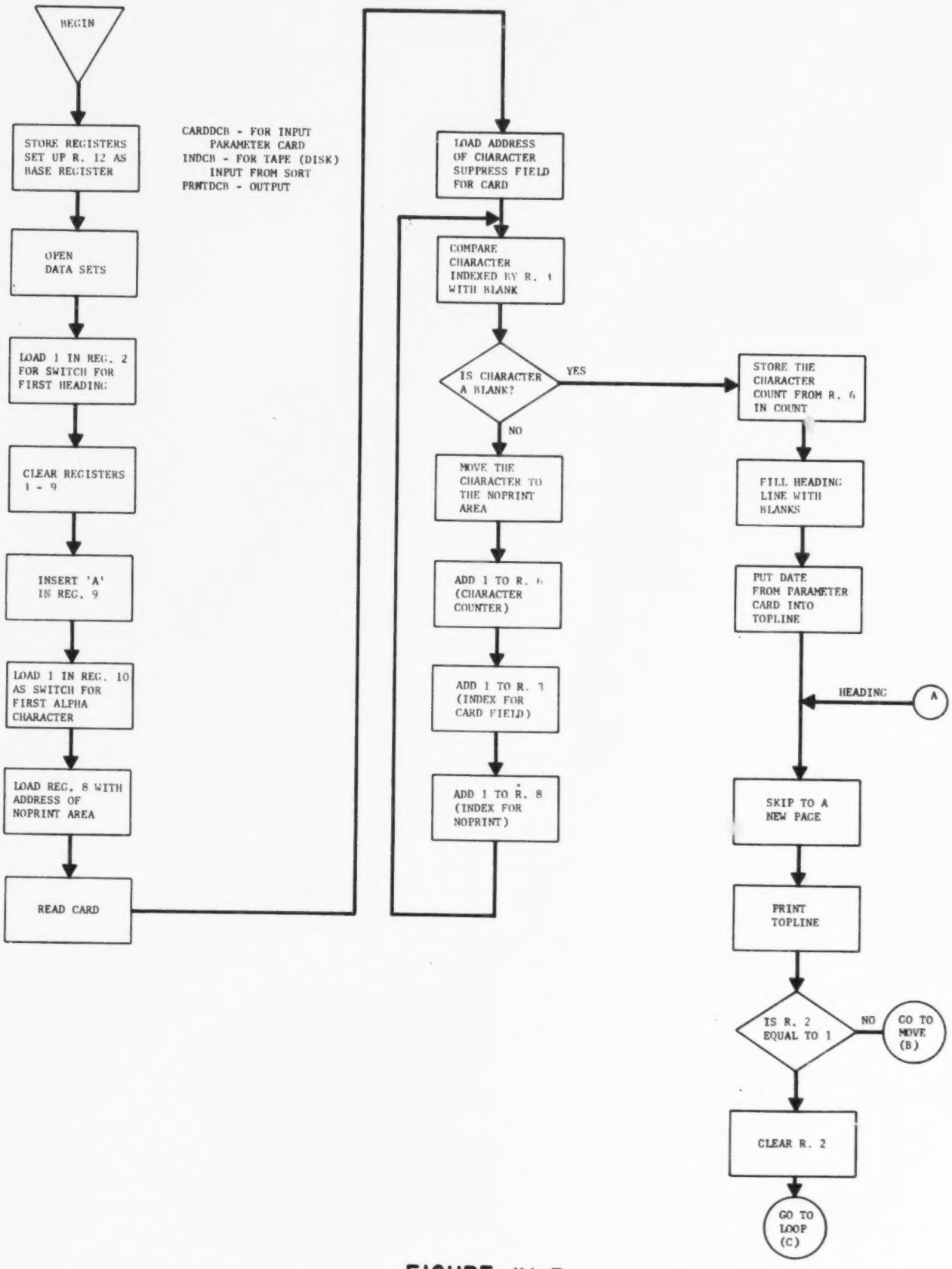

BEGIN
STORE REGISTERS SET UP R. 12 AS BASE REGISTER
OPEN DATA SETS
LOAD 1 IN REG. 2 FOR SWITCH FOR FIRST HEADING
CLEAR REGISTERS 1 - 9
INSERT 'A' IN REG. 9
LOAD 1 IN REG. 10 AS SWITCH FOR FIRST ALPHA CHARACTER
LOAD REG. 8 WITH ADDRESS OF NOPRINT AREA
READ CARD
CARDDCB - FOR INPUT PARAMETER CARD
INDCB - FOR TAPE (DISK) INPUT FROM SORT
PRNTDCB - OUTPUT
LOAD ADDRESS OF CHARACTER SUPPRESS FIELD FOR CARD
COMPARE CHARACTER INDEXED BY R. 1 WITH BLANK
IS CHARACTER A BLANK?
YES
NO
MOVE THE CHARACTER TO THE NOPRINT AREA
ADD 1 TO R. 6 (CHARACTER COUNTER)
ADD 1 TO R. 3 (INDEX FOR CARD FIELD)
ADD 1 TO R. 8 (INDEX FOR NOPRINT)
STORE THE CHARACTER COUNT FROM R. 6 IN COUNT
FILL HEADING LINE WITH BLANKS
PUT DATE FROM PARAMETER CARD INTO TOPLINE
HEADING
A
SKIP TO A NEW PAGE
PRINT TOPLINE
IS R. 2 EQUAL TO 1
NO
GO TO MOVE (B)
CLEAR R. 2
GO TO LOOP (C)

FIGURE IV-3
PROGRAM FLOW CHART FOR KWOC 2 PROGRAM

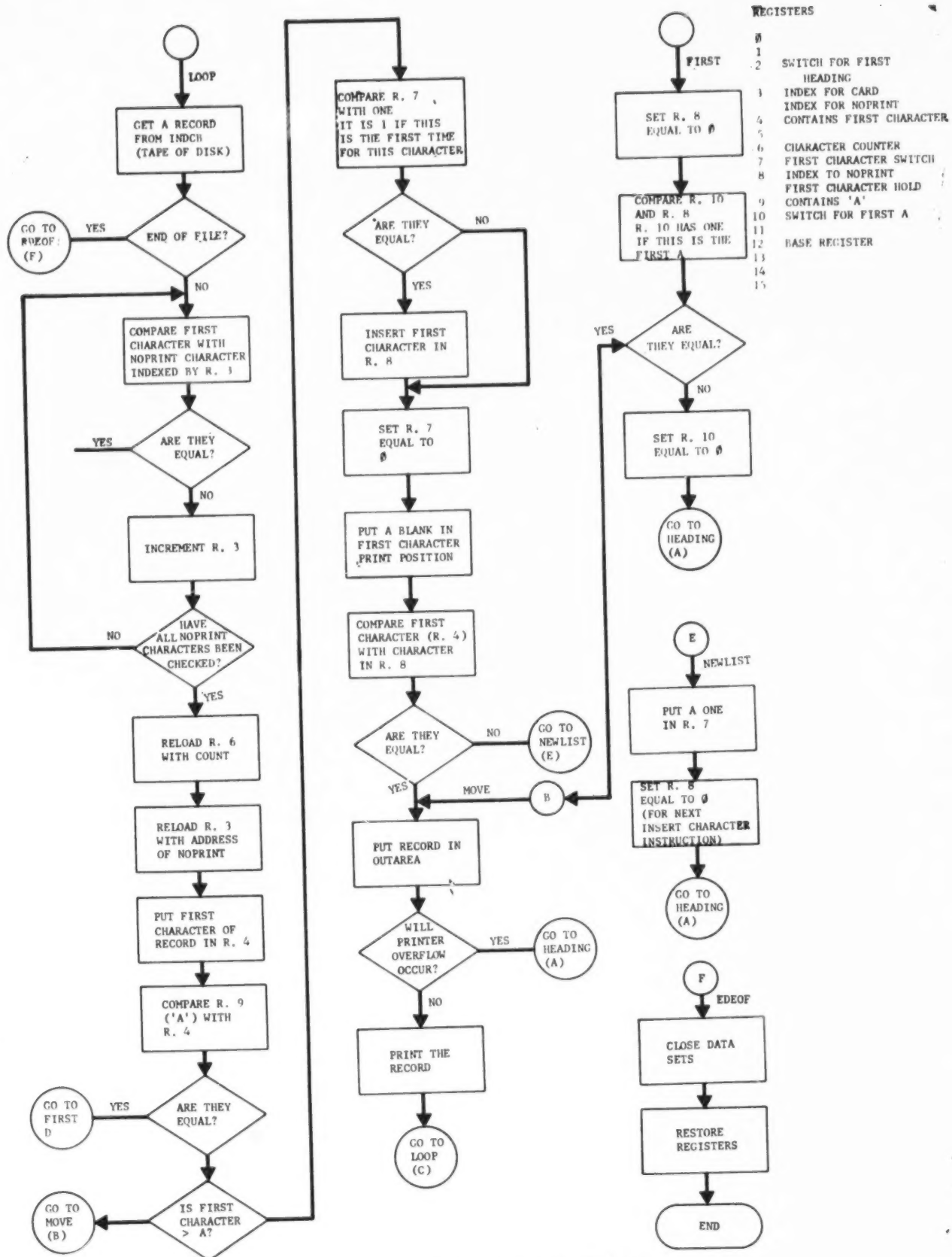


FIGURE IV-3(CONT'D)
PROGRAM FLOW CHART FOR KWOC 2 PROGRAM

```
      KEYWORD CLT OF CONTEXT (KWOC) RECORD GENERATION                                                    PAGE    2
                                                                                                  (page 1 intentionally omitted)
LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                        F30SEP69   6/17/70

                                   3 * THIS PROGRAM CONSIDERS AS KEYWORDS ANY AND ALL CHARACTER STRINGS      00000030
                                   4 *                  1. MORE THAN ONE CHARACTER IN LENGTH                 00000040
                                   5 *                  2. NOT INCLUDED IN A TABLE (STOP LIST)               00000050
                                   6 *                  3. NOT SEPARATED FROM OTHER STRINGS BY COMMA         00000060
                                   7 *                  OR BLANK.                                            00000070
                                   8 * WHEN THE PROGRAM IS MODIFIED TO ADD WORDS THAT ARE TO BE ELIMINATED  00000080
                                   9 * FROM THE TABLE OF NON-KEY-WORDS, THE VALUE OF 'COUNT' MUST BE CHANGED 00000090
                                  10 * TO THE NEW NUMBER OF WORDS IN THE LIST AND THE PROGRAM MUST BE        00000100
                                  11 * ASSEMBLED TO PRODUCE ANOTHER OBJECT DECK.                            00000110
                                  12 *                                                                      00000120
                                  13 *                                                                      00000130
CC0000                            14          CSECT                                                       00000140
                                  15 BEGIN    SAVE  (14,12)                                               00000150
CCC000                            16+BEGIN    DS    0H
0CCCC0 90EC D00C          0000C   17+          STM   14,12,12(13) SAVE REGISTERS
CCCCC4 05C0                       18          BALR  12,0
CCC0C6                            19          USING *,12                                                  00000160
CCC0C6 5000 C15E          00164   20          ST    13,SAVEAREA+4                                         00000170
CCCCCA 41D0 C15A          0C160   21          LA    13,SAVEAREA                                           00000180
                                  22          PRINT NOGEN                                                 00000190
                                  23          OPEN  (INDCB,,OUTDCB,(OUTPUT))                              00000200
CCCC1E 1844                       31          SR    4,4                                                   00000210
000020 1B88                       32          SR    8,8                                                   00000220
C0C022 4340 C2CA          002D0   33          IC    4,BLANK                                               00000230
CCCC26 43E0 C3FE          CC4C4   34          IC    8,=C',' 
                                  35 *                                                                      00000250
                                  36 MAINLINE GET   INDCB,CARD              GET A RECORD                    00000260
                                  41          SR    5,5                 ******CLEAR REGISTERS******       00000270
                                  42          SR    6,6                                                   00000280
                                  43          SR    7,7                                                   00000290
                                  44          SR    9,9                                                   00000300
                                  45 *                                                                      00000310
CCCC4C D200 C1A2 C2CA 0C1A8 002D0 46 CLEAR    MVC   DATAOUT(1),BLANK          CLEAR OUTPUT AREA         00000320
CCC046 D27A C1A3 C1A2 0C1A9 CC1A8 47          MVC   DATAOUT+1(123),DATAOUT                              00000330
00004C D213 C2E4 C2C0 002EA 002D6 48          MVC   WORD,BLWORD           BLANK OUT THE WORD AREA       00000340
                                  49 *                                                                      00000350
000052 D24F C270 C21F 0C276 CC225 5C MOVNAM   MVC   LNAME+1(80),CARD          MOVE CARD IMAGE           00000360
000058 D200 C26F C2CE 00275 002D4 51          MVC   LNAME(1),DUMMY      INSERTS DUMMY IN FIRST POSITION 00000370
CCC05E 4960 C2CC          002C6   52 LOOP     CH    6,ENDNAM                                              00000380
0C006Z 4780 C0E2          0CCB8   53          BE    ON                                                    00000390
CCC066 4720 C024          0002A   54          BH    MAINLINE                                              00000391
CCCC6A 4570 C2C4          CC2CA   55          CH    7,FOUR                COMPARE FOR  4 BLANKS           00000400
00006E 4780 C024          0002A   56          BE    MAINLINE                                              00000410
CCCC72 4356 C26F          00275   57          IC    5,LNAME(6)                                            00000420
0CC076 1554                       58          CLR   5,4                   COMPARE CHAR TO BLANK           00000430
0CC078 4780 C096          0009C   59          BE    MOVWRD                                                00000440
CCCC7C 1558                       60          CLR   5,8             COMPARE CHARACTER TO COMMA            00000450
00007E 4780 C096          0C09C   61          BE    MOVWRD                                                00000460
CCCC82 4259 C2E4          002EA   62 STOR     STC   5,WORD(9)                                             00000470
CCCC86 4A90 C2C8          002CE   63          AH    9,ONE                                                 00000480
00008A 1B77                       64          SR    7,7                                                   00000490
CCCC8C 4960 C2C0          002C6   65          CH    6,ENDNAM                COMPARE FOR END OF  RECORD    00000500
CCCC9C 4780 C0B2          CC0B8   66          BE    ON                                                    00000510
000094 4A6C C2C8          CC2CE   67 SKPSLB   AH    6,ONE                   ADD 1 TO CHAR COUNT           00000520
CCC098 47F0 CC5E          0005E   68          B     LOOP                                                  00000530
                                                                                                        00000540
```

FIGURE V-I
KWOC-I PROGRAM LISTING

```
 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F30SEP69   6/17/70

                                   69 *                                                                00000550
                                   70 *                                                                00000560
000C9C 4960 C2C6            002CC  71 MOVWRD   CH    6,ZERO                                         00000570
000CAC 4780 CC24            0002A  72          BE    MAINLINE                                       00000580
000CA4 4A70 C2C8            002CE  73          AH    7,ONE                                          00000590
000CA8 4970 C2C8            002CE  74          CH    7,ONE                                          00000600
000CAC 4780 C0B2            00088  75          BE    ON                                             00000610
000CB0 4A60 C2C8            002CE  76          AH    6,ONE                                          00000620
000CB4 47F0 CC5E            0005E  77          B     LOOP                                           00000630
000CB8 4990 C2C8            002CE  78 ON       CH    9,ONE                IS WORD A SINGLE CHARACTER 00000640
000CBC 4780 C110            00116  79          BE    CLRWORD                                        00000650
000CC0 41A0 C2E4            002EA  80          LA    10,WORD                                        00000651
0000C4 D500 A000 C2CC CCC00 002D2  81          CLC   0(1,10),COLON    IS FIRST CHARACTER A COLON? 00000652
000CCA 4770 C0C2            000D8  82          BNE   LOADTAB                                        00000653
000CCE D200 ACCC C2CD 0CCCC 002D3  83          MVC   0(1,10),EQUALS      SUBSTITUTE = FOR :       00000654
0000D4 47F0 C0EC            000F2  84          B     STORLAST      SKIP TABLE - NOT ON LIST         00000655
000CD8 4130 C4C6            0040C  85 LOADTAB  LA    3,TABLE       LOAD ADDRESS TO CHECK STOP-LIST  00000660
000CDC 5820 C402            0C408  86          L     2,COUNT                                        00000670
000CE0 D513 3000 C2E4 00000 002EA  87 TABLOOP  CLC   0(20,3),WORD                                   00000680
000CE6 4780 C110            00116  88          BE    CLRWORD                                        00000690
000CEA 4133 0014            00014  89          LA    3,20(3)              INCREMENT ADDRESS         00000700
000CEE 4620 C0EA            000E0  90          BCT   2,TABLOOP            BRANCH OUT IF ALL WORDS CHECKED 00000710
000CF2 D513 C2E4 C2DC CC2EA 002D6  91 STORLAST CLC   WORD(20),BLWORD                                 00000720
0000F8 4780 C110            00116  92          BE    CLRWORD                                        00000721
000CFC D213 C1A2 C2E4 001A8 002EA  93          MVC   DATAOUT(20),WORD        MOVES KEY WORD TO O/P AREA 00000722
000102 D250 C1B8 C26F 0C1BF 00275  94          MVC   DATAOUT+23(81),LNAME                           00000730
                                   95          PUT   OUTDCB,DATAOUT                                 00000740
000116 D213 C2E4 C2D0 002EA 002D6 100 CLRWORD  MVC   WORD,BLWORD             BLANK WORD AREA        00000750
000118 1B99                       101          SR    9,9                                            00000760
00011E 4960 C2C2            002C8 102          CH     6,NEARLY                                      00000770
000122 4780 CC24            0002A 103          BE    MAINLINE       GET NEW RECORD IF ONLY ONE OR TWO 00000780
000126 4960 C3FA            00400 104          CH    6,=H'79'       CHARACTERS OR BLANKS REMAIN     00000790
00012A 4780 C024            0002A 105          BE    MAINLINE                                       00000800
00012E 4960 C3FC            0C4C2 106          CH    6,=H'78'                                       00000810
000132 4780 C024            0002A 107          BE    MAINLINE                                       00000820
000136 4A60 C2C8            002CE 108 ACCBR    AH    6,ONE                                          00000830
00013A 47F0 CC58            C005E 109          B     LOOP                                           00000840
                                  110 *                                                             00000850
                                  111 *                                                             00000860
                                  112 RDEOF    CLOSE (INCCB)                                        00000870
                                  118          CLOSE (OUTDCB)                                       00000880
000156 58D0 C15E            00164 124          L     13,SAVEAREA+4                                  00000890
                                  125          RETURN (14,12)                                       00000900
                                  128 *                                                             00000910
                                  129 *        CONSTANTS USED ABOVE                                 00000920
000160                            130 SAVEAREA CS    18F                                            00000930
0001A8                            131          DS    0H                                             00000940
0001A8                            132 DATAOUT  CS    CL125                OUTPUT AREA               00000950
000225                            133 CARD     DS    CL80                                           00000960
000275                            134 LNAME    DS    CL81                                           00000970
000276 0051                       135 ENDNAM   DC    XL2'51'                                        00000980
0002C8 0050                       136 NEARLY   DC    XL2'50'                                        00000990
0002CA 0004                       137 FOUR     DC    XL2'4'                                         00001000
0002CC 0000                       138 ZERO     DC    XL2'0'               FOR ZEROING               00001010
0002CE 0001                       139 ONE      DC    XL2'1'                                         00001020
```

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

```
 LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                F30SFP69   6/17/70
CCC2D0 4040                          140 BLANK    CC    CL2' '                                                        00001030
CCC2D2 7A                            141 CCLCN    CC    CL1':'                                                        00001031
0002D3 7E                            142 EQUALS   DC    CL1'='                                                        00001032
CC02D4 C049                          143 DUMMY    CC    XL2'00'          DUMMY HAS TO BE A NON-PRINTABLE,             00001040
                                     144 *                               NON-BLANK CHARACTER LOWER IN THE             00001041
                                     145 *                               COLLATING SEQUENCE THAN ANY ALPHA            00001042
                                     146 *                               CHARACTER                                    00001043
0002D6 40404C40404C4040              147 BLWORD   DC    CL20'              '     BLANK WORD AREA                     00001050
CCC2EA 4040404040404040              148 WORD     DC    CL20' '          WORD HOLD                                    00001060
CCC2FE 40404C4C4C4C4C4C              149 SPACE    CC    CL80' '        FOR WORDS LONGER THAN 20 CHARACTERS            00001070
                                     150 *                             TO PREVENT CLOBBERING TABLE COUNT              00001080
                                     151 *                                                                            00001090
                                     152 *          DCB DEFINITIONS                                                   00001100
                                     153 *                                                                            00001110
                                     154 INDCB  DCB    BLKSIZE=80,DDNAME=CARDDD,DEVD=RD,DSORG=PS,EODAD=RDEOF,        X00001120
                                                       LRECL=80,MACRF=(GM),RECFM=FB                                   00001130
                                     210 *                                                                            00001140
                                     211 OUTDCB   DCB    BFALN=F,BFTEK=S,DDNAME=QUICOUT,DEVD=DA,                     X00001150
                                                       LRECL=125,BLKSIZE=6250,                                       X00001160
                                                       DSORG=PS,EROPT=SKP,MACRF=(PM),RFCFM=FB                         00001170
CCC4C0                               267           LTORG                                                           00001180
CCC4C0 004F                          268                 =H'79'
000402 004E                          269                 =H'78'
CCC4C4 6B                            270                 =C',' 
CCC4C5 CCCC0C
CCC4C8 00C0018E                      271 COUNT    DC    F'398'                                                        00001190
                                     272 * 'COUNT' GIVES NUMBER OF WORDS IN 'TABLE'.  ITS VALUE MUST BE             00001200
                                     273 * CHANGED WHEN WORDS ARE ADDED CR DELETED.                                   00001210
CCC4CC C1C2D3C5404C4040              274 TABLE    DC    CL20'ABLE            '                                       00001220
CC0420 C1C2D6E4E34C4C4C              275          DC    CL20'ABOUT           '                                       00001230
000434 C1C2D6E5C54C4040              276          DC    CL20'ABOVE           '                                       00001240
CCC448 C1C3C3D6D4C7C1D5              277          DC    CL20'ACCOMPANY       '                                       00001250
CCC45C C1C3C3D6D9C44040              278          DC    CL20'ACCORD          '                                       00001260
000470 C1C3D9D6E2E24040              279          DC    CL20'ACROSS          '                                       00001270
CCC484 C1C3E3E4C1D34040              280          DC    CL20'ACTUAL          '                                       00001280
CCC498 C1C4C44040C4C4040             281          DC    CL20'ADD             '                                       00001290
00C4AC C1C6C6C5C3E34040              282          DC    CL20'AFFECT          '                                       00001300
CCC4C0 C1C6E3C5D5C4C4C4              283          DC    CL20'AFTER           '                                       00001310
0004D4 C1C6E3C5D5E6C1D5              284          DC    CL20'AFTERWARD       '                                       00001320
CCC4E8 C1C7C1C9D5404040              285          DC    CL20'AGAIN           '                                       00001330
0004FC C1C7C1C9D5E2E340              286          DC    CL20'AGAINST         '                                       00001340
000510 C1C7D640404C4040              287          DC    CL20'AGO             '                                       00001350
000524 C1D3D34C404C4040              288          DC    CL20'ALL             '                                       00001360
000538 C1D3D3D6E6C5C44C              289          DC    CL20'ALLOWED         '                                       00001370
00054C C1D3D3D6E6C9D5C7              290          DC    CL20'ALLOWING        '                                       00001380
CCC560 C1D3D3D6E6E24040              291          DC    CL20'ALLOWS          '                                       00001390
CC0574 C1D3D4D6E2E34040              292          DC    CL20'ALMOST          '                                       00001400
CC0588 C1D3D6D5C5404040              293          DC    CL20'ALONE           '                                       00001410
CCC59C C1D3D6D5C74C4040              294          DC    CL20'ALONG           '                                       00001420
0005E0 C1D3D9C5C1C4E84C              295          DC    CL20'ALREADY         '                                       00001430
CCC5C4 C1D3E2D640404040              296          DC    CL20'ALSO            '                                       00001440
CCC5D8 C1D3E3C8D6E4C7C6              297          DC    CL20'ALTHOUGH        '                                       00001450
0005EC C1D3E6C1E8E24040              298          DC    CL20'ALWAYS          '                                       00001460
CCC6C0 C1D44C4C4C4C4040              299          DC    CL20'AM              '                                       00001470
CCC614 C1D4D6D5C74C404C              300          DC    CL20'AMONG           '                                       00001480
```

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

F30SEP69 6/17/70

```
 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT
000628 C1D54C4C40404040              301         DC    CL20'AN                 .  00001490
000638 C1D5C44C4C4C4040              302         DC    CL20'ANC                .  00001500
000650 C1D5D6E3C8C5D54C              303         DC    CL20'ANOTHER            .  00001510
000664 C1D5E54C404C4040              304         DC    CL20'ANY                .  00001520
000678 C1D5E5E3C8C5D5C7              305         DC    CL20'ANYTHING           .  00001530
00068C C1D7D7D3E8404040              306         DC    CL20'APPLY              .  00001540
0006A0 C1D7D7D3E8C5D5C7              307         DC    CL20'APPLYING           .  00001550
0006B4 C1D9C540404C4040              308         DC    CL20'ARE                .  00001560
0006C8 C1D9D6E4D5C44040              309         DC    CL20'AROUND             .  00001570
0006DC C1E240404C4C4040              310         DC    CL20'AS                 .  00001580
0006F0 C1E2D240404C4C40              311         DC    CL20'ASK                .  00001590
000704 C1E2D2C5C4404040              312         DC    CL20'ASKED              .  00001600
000718 C1E2D2C9D5C74040              313         DC    CL20'ASKING             .  00001610
00072C C1E2D2E2404C404C              314         DC    CL20'ASKS               .  00001620
000740 C1E6C1E840404040              315         DC    CL20'AWAY               .  00001630
000754 C1E3404C4C4C4C4C              316         DC    CL20'AT                 .  00001640
000768 C2C1E2C5C4404040              317         DC    CL20'BASED              .  00001650
00077C C2C540404C4C4040              318         DC    CL20'BE                 .  00001660
000790 C2C5C3C1D4C5404C              319         DC    CL20'BECAME             .  00001670
0007A4 C2C5C3C1E4E2C540              320         DC    CL20'BECAUSE            .  00001680
0007B8 C2C5C3D6D4C5404C              321         DC    CL20'BECOME             .  00001690
0007CC C2C5C5D54C4C4040              322         DC    CL20'BEEN               .  00001700
0007E0 C2C5C6D6D5C54040              323         DC    CL20'BEFORE             .  00001710
0007F4 C2C5C7C1D54C4040              324         DC    CL20'BEGAN              .  00001720
000808 C2C5C7C9D54C4C4C              325         DC    CL20'BEGIN              .  00001730
00081C C2C5C7C9D5E24040              326         DC    CL20'BEGINS             .  00001740
000830 C2C5C8C9D5C44C4C              327         DC    CL20'BEHIND             .  00001750
000844 C2C5C9D5C7404040              328         DC    CL20'BEING              .  00001760
000858 C2C5D3C9C5E5C540              329         DC    CL20'BELIEVE            .  00001770
00086C C2C5D3D6E4C4040               330         DC    CL20'BELOW              .  00001780
000880 C2C5D5C5C1E3C840              331         DC    CL20'BENEATH            .  00001790
000894 C2C5E2C9C4C5404C              332         DC    CL20'BESIDE             .  00001800
0008A8 C2C5E2E34C4C4C4C              333         DC    CL20'BEST               .  00001810
0008BC C2C5E3E3C5D54040              334         DC    CL20'BETTER             .  00001820
0008D0 C2C5E3E6C5C5D540              335         DC    CL20'BETWEEN            .  00001830
0008E4 C2C5E6D6D5C4404C              336         DC    CL20'BEYOND             .  00001840
0008F8 C2D6E3C840404040              337         DC    CL20'BOTH               .  00001850
00090C C2D9C5D5C74C4C4C              338         DC    CL20'BRING              .  00001860
000920 C2D9C5D5C7C5C5C7              339         DC    CL20'BRINGING           .  00001870
000934 C2D9C5D5C7E24040              340         DC    CL20'BRINGS             .  00001880
000948 C2D9D6E4C7C8E340              341         DC    CL20'BROUGHT            .  00001890
00095C C2E4E34040404040              342         DC    CL20'BUT                .  00001900
000970 C2E8404040404040              343         DC    CL20'BY                 .  00001910
000984 C3C1D4C5404C4040              344         DC    CL20'CAME               .  00001920
000998 C3C1D5404040C4040             345         DC    CL20'CAN                .  00001930
0009AC C3C1D5D5D6E34040              346         DC    CL20'CANNOT             .  00001940
0009C0 C3C1E4E2C5C44C4C              347         DC    CL20'CAUSED             .  00001950
0009D4 C3C1E4E2C9C5C740              348         DC    CL20'CAUSING            .  00001960
0009E8 C3C5D5E3C1C9D54C              349         DC    CL20'CERTAIN            .  00001970
0009FC C3D3C5C1D9C3E840              350         DC    CL20'CLEARLY            .  00001980
000A10 C3D6E4E4C4C4C4040             351         DC    CL20'CO.                .  00001990
000A24 C3D6D4C54C4C4040              352         DC    CL20'COME               .  00002000
000A38 C3D6D4C5E2404040              353         DC    CL20'COMES              .  00002010
000A4C C3D6D4C9D5C74040              354         DC    CL20'COMING             .  00002020
000A60 C3D6D5E2C9C4C5D5              355         DC    CL20'CONSIDER           .  00002030
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FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT
000A74 C3D6D9D74E404040           356         DC    CL20'CORP.          ' 00002040
000A88 C3D6E4D3C440404C           357         DC    CL20'COULD          ' 00002050
000A9C C4C5D7E34B4C4040           358         DC    CL20'DEPT.          ' 00002060
000AB0 C4C5E2D7C9E3C540           359         DC    CL20'DESPITE        ' 00002070
000AC4 C4C9C44C4C4C4C4C           360         DC    CL20'DID            ' 00002080
000AD8 C4D64040404C404C           361         DC    CL20'DO             ' 00002090
000AEC C4D6C5E24C4C404C           362         DC    CL20'DOES           ' 00002100
000B00 C4D6C9D5C74C4C4C           363         DC    CL20'DOING          ' 00002110
000B14 C4D6D5C5404C4040           364         DC    CL20'DONE           ' 00002120
000B28 C4D6E6D54C4C4040           365         DC    CL20'DOWN           ' 00002130
000B3C C4E4C5404C4C404C           366         DC    CL20'DUE            ' 00002140
000B50 C4E4D9C5C5C74040           367         DC    CL20'DURING         ' 00002150
000B64 C5C1C3C8404C4040           368         DC    CL20'EACH           ' 00002160
000B78 C5C1E2E84C4C404C           369         DC    CL20'EASY           ' 00002170
000B8C C5C1E2C9D3E84040           370         DC    CL20'EASILY         ' 00002180
000BA0 C5C9C7C8E34C4C4C           371         DC    CL20'EIGHT          ' 00002190
000BB4 C5C9E3C8C5D54C4C           372         DC    CL20'EITHER         ' 00002200
000BC8 C5D3E2C54C4C4040           373         DC    CL20'ELSE           ' 00002210
000BDC C5D5D6E4C7CE4C4C           374         DC    CL20'ENOUGH         ' 00002220
000BF0 C5E2D7C5C3C9C1C3           375         DC    CL20'ESPECIAL       ' 00002230
000C04 C5E3C3484C4C4040           376         DC    CL20'ETC.           ' 00002240
000C18 C5E5C5D54C4C4C40           377         DC    CL20'EVEN           ' 00002250
000C2C C5E5C5D5404C4040           378         DC    CL20'EVER           ' 00002260
000C40 C5E5C5D5E84C4C40           379         DC    CL20'EVERY          ' 00002270
000C54 C5E5C5D5E8E3C8C5           380         DC    CL20'EVERYTHING     ' 00002280
000C68 C6C1D5C40404040C           381         DC    CL20'FAR            ' 00002290
000C7C C6C1D5E3C6C5D54C           382         DC    CL20'FARTHER        ' 00002300
000C90 C6C5E640404C4C40           383         DC    CL20'FEW            ' 00002310
000CA4 C6C5E6C5D54C4040           384         DC    CL20'FEWER          ' 00002320
000CB8 C6C905C1D3D3E84C           385         DC    CL20'FINALLY        ' 00002330
000CCC C6C9D5C44C404040           386         DC    CL20'FIND           ' 00002340
000CE0 C6C9D5C4C9C5C740           387         DC    CL20'FINDING        ' 00002350
000CF4 C6C9D5C4E24C4C4C           388         DC    CL20'FINDS          ' 00002360
000D08 C6C9E5C540404040           389         DC    CL20'FIVE           ' 00002370
000D1C C6D6D3D3D6E64040           390         DC    CL20'FOLLOW         ' 00002380
000D30 C6D6D5C4C4C4C4C4           391         DC    CL20'FOR            ' 00002390
000D44 C6D6D5E3C8404040           392         DC    CL20'FORTH          ' 00002400
000D58 C6D6D5E3C6C3D6D4           393         DC    CL20'FORTHCOMING    ' 00002410
000D6C C6D6E4D5C44C404C           394         DC    CL20'FOUND          ' 00002420
000D80 C6D6E4D5404C404C           395         DC    CL20'FOUR           ' 00002430
000D94 C6D9D6D44C4C4C40           396         DC    CL20'FROM           ' 00002440
000DA8 C6C9D6C5E3404040           397         DC    CL20'FRONT          ' 00002450
000DBC C6E4D3C6C9D34040           398         DC    CL20'FULFIL         ' 00002460
000DD0 C6E4D3D34C4C404C           399         DC    CL20'FULL           ' 00002470
000DE4 C6E4D3D3E8404040           400         DC    CL20'FULLY          ' 00002480
000DF8 C6E4D5E3C6C5D54C           401         DC    CL20'FURTHER        ' 00002490
000E0C C7C1E5C540404040           402         DC    CL20'GAVE           ' 00002500
000E20 C7C5E34C404C4040           403         DC    CL20'GET            ' 00002510
000E34 C7C5E3E2404C4C4C           404         DC    CL20'GETS           ' 00002520
000E48 C7C5E3E3C5C5C74C           405         DC    CL20'GETTING        ' 00002530
000E5C C7C9E5C54C4C4040           406         DC    CL20'GIVE           ' 00002540
000E70 C7C9E5C5D54C4C4C           407         DC    CL20'GIVEN          ' 00002550
000E84 C7C9E5C5E2404040           408         DC    CL20'GIVES          ' 00002560
000E98 C7C9E5C9D5C74040           409         DC    CL20'GIVING         ' 00002570
000EAC C7D64C4C4C4C404C           410         DC    CL20'GO             ' 00002580
```

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

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LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT
000EC0 C7D6C5E240404040           411        DC    CL20'GOES            .   00002590
000ED4 C7D6C9D5C74C4040           412        DC    CL20'GOING           .   00002600
000EE8 C7D6D5C5404C404C           413        DC    CL20'GONE            .   00002610
000EFC C7D6D6C440404040           414        DC    CL20'GOOD            .   00002620
000F10 C7D6E34C4C4C4C4C           415        DC    CL20'GOT             .   00002630
000F24 C8C1C4404C4C4040           416        DC    CL20'HAD             .   00002640
000F38 C8C1D7C7C5D54C4C           417        DC    CL20'HAPPEN          .   00002650
000F4C C8C1E24C4C404C40           418        DC    CL20'HAS             .   00002660
000F60 C8C1E5C540404040           419        DC    CL20'HAVE            .   00002670
000F74 C8C1E5C9D5C74040           420        DC    CL20'HAVING          .   00002680
000F88 C8C5404C404C4040           421        DC    CL20'HE              .   00002690
000F9C C8C5D940404C4040           422        DC    CL20'HER             .   00002700
000FB0 C8C5D5C54C4C4040           423        DC    CL20'HERE            .   00002710
000FC4 C8C5D5E2404C404C           424        DC    CL20'HERS            .   00002720
000FD8 C8C5D9E2C5E3C640           425        DC    CL20'HERSELF         .   00002730
000FEC C8C9D44C4C4C4C4C           426        DC    CL20'HIM             .   00002740
001000 C8C9D4E2C5E3C640           427        DC    CL20'HIMSELF         .   00002750
001014 C8C9E2404C4C4C40           428        DC    CL20'HIS             .   00002760
001028 C8D6EE40404C4C4C           429        DC    CL20'HOW             .   00002770
00103C C8D6E6C5E5C5C940           430        DC    CL20'HOWEVER         .   00002780
001050 C9404C4C4C4C4040           431        DC    CL20'I               .   00002790
001064 C9C64C4C4C4C4040           432        DC    CL20'IF              .   00002800
001078 C9D5404C404C4040           433        DC    CL20'IN              .   00002810
001C8C C9D5C348404C4040           434        DC    CL20'INC.            .   00002820
0010A0 C9D5C3D3E4C4C54C           435        DC    CL20'INCLUDE         .   00002830
001084 C9D5C4C5C5C44040           436        DC    CL20'INDEED          .   00002840
0010C8 C9D5E2C9C4C54C4C           437        DC    CL20'INSIDE          .   00002850
0010DC C9D5E2E3C5C1C440           438        DC    CL20'INSTEAD         .   00002860
0010F0 C9D5E3D64C4C4040           439        DC    CL20'INTO            .   00002870
001104 C9D5E5D6D3E5C54C           440        DC    CL20'INVOLVE         .   00002880
001118 C9E24040404C4040           441        DC    CL20'IS              .   00002890
00112C C9E34C404C4C4040           442        DC    CL20'IT              .   00002900
001140 C9E3E2404C4C4040           443        DC    CL20'ITS             .   00002910
001154 C9E3E2C5E3C64040           444        DC    CL20'ITSELF          .   00002920
001168 D1E4E2E34C4C4040           445        DC    CL20'JUST            .   00002930
00117C D2C5C5D74C4C404C           446        DC    CL20'KEEP            .   00002940
001190 D2C5C5D7C9E5C740           447        DC    CL20'KEEPING         .   00002950
0011A4 D2C5C5D7E24C404C           448        DC    CL20'KEEPS           .   00002960
0011B8 D2C5D7E3404C404C           449        DC    CL20'KEPT            .   00002970
0011CC D2D5C5E64C4C4040           450        DC    CL20'KNEW            .   00002980
0011E0 D2D5D6E64C4C4040           451        DC    CL20'KNOW            .   00002990
0011F4 D2D5D6E6C5E5C740           452        DC    CL20'KNOWING         .   00003000
001208 D2D5D6E6D5404040           453        DC    CL20'KNOWN           .   00003010
00121C D2D5D6E6E24C4040           454        DC    CL20'KNOWS           .   00003020
001230 D3C1D9C7C5C3E840           455        DC    CL20'LARGELY         .   00003030
001244 D3C1E2E340404040           456        DC    CL20'LAST            .   00003040
001258 D3C1E3C5404C404C           457        DC    CL20'LATE            .   00003050
00126C D3C1E3C5D3E84040           458        DC    CL20'LATELY          .   00003060
001280 D3C1E3C5D5C4C4C4           459        DC    CL20'LATER           .   00003070
001294 D3C5C1E2E340404C           460        DC    CL20'LEAST           .   00003080
0012A8 D3C5C1E5C5404040           461        DC    CL20'LEAVE           .   00003090
0012BC D3C5E2E24C4C4C4C           462        DC    CL20'LESS            .   00003100
0012D0 D3C5E340404C4C4C           463        DC    CL20'LET             .   00003110
0012E4 D3C5E3E2404C404C           464        DC    CL20'LETS            .   00003120
0012F8 D3C5E3E3C9D5C74C           465        DC    CL20'LETTING         .   00003130
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FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

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 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT

001300 C3C9D2C5404C4040          466         DC    CL20'LIKE                .  00003140
001320 D3C9D2C5D3E84040          467         DC    CL20'LIKELY              .  00003150
001334 D3C5D2C5E24C4C4C          468         DC    CL20'LIKES               .  00003160
001348 D3C9E3E3D3C54040          469         DC    CL20'LITTLE              .  00003170
001360 D3D6D5C74C4C4040          470         DC    CL20'LONG                .  00003180
001370 D3D6D5C7E24C4040          471         DC    CL20'LONGS               .  00003190
001384 D3D6D6D240404040          472         DC    CL20'LOOK                .  00003200
001398 D3D6D6D2C5D5C74C          473         DC    CL20'LOOKING             .  00003210
0013AC D3D6E640404C4040          474         DC    CL20'LOW                 .  00003220
0013C0 D3E3C44B4C4C4040          475         DC    CL20'LTD.                .  00003230
0013D4 D4C1C4C54C4C4040          476         DC    CL20'MADE                .  00003240
0013E8 D4C1D2C540404040          477         DC    CL20'MAKE                .  00003250
0013FC D4C1D2C5E24C4040          478         DC    CL20'MAKES               .  00003260
001410 D4C1D2C5D5C74C4C          479         DC    CL20'MAKING              .  00003270
001424 D4C1D5E840404040          480         DC    CL20'MANY                .  00003280
001438 D4C1E6C4C4C4040           481         DC    CL20'MAY                 .  00003290
00144C D4C5404C4C4C4C4C          482         DC    CL20'ME                  .  00003300
001460 D4C5D5C540404040          483         DC    CL20'MERE                .  00003310
001474 D4C5D5C5D3E6C4C4          484         DC    CL20'MERELY              .  00003320
001488 D4C9C7C8E3404040          485         DC    CL20'MIGHT               .  00003330
00149C D4D6D5C5404C4040          486         DC    CL20'MORE                .  00003340
0014B0 D4D6D5C5D6E5C5D5          487         DC    CL20'MOREOVER            .  00003350
0014C4 D4D6E2E340404040          488         DC    CL20'MOST                .  00003360
0014D8 D4E4C3C6C4C4C4C0          489         DC    CL20'MUCH                .  00003370
0014EC D4E4E2E34C4C4C40          490         DC    CL20'MUST                .  00003380
001500 D4E840404C40404040        491         DC    CL20'MY                  .  00003390
001514 D4E8E2C5D3C64C40          492         DC    CL20'MYSELF              .  00003400
001528 D5C5C1D9D3E84C4C          493         DC    CL20'NEARLY              .  00003410
00153C D5C5C5C440404040          494         DC    CL20'NEED                .  00003420
001550 D5C5C5C4C5C44C4C          495         DC    CL20'NEEDED              .  00003430
001564 D5C5C5C4E2404040          496         DC    CL20'NEEDS               .  00003440
001578 D5C5C5E3C6C5D5C4          497         DC    CL20'NEITHER             .  00003450
00158C D5C5E5C5D5C4C040          498         DC    CL20'NEVER               .  00003460
0015A0 D5C5E5C5D9E3C8C5          499         DC    CL20'NEVERTHELESS        .  00003470
0015B4 D5C5E7E3404C404C          500         DC    CL20'NEXT                .  00003480
0015C8 D5C5D5C54C4C4C40          501         DC    CL20'NINE                .  00003490
0015DC D5D64C4C404C4040          502         DC    CL20'NO                  .  00003500
0015F0 D5D6D5C54C4C4040          503         DC    CL20'NONE                .  00003510
001604 D5D6D94C404C4C4C          504         DC    CL20'NOR                 .  00003520
001618 D5D6E340404C4040          505         DC    CL20'NOT                 .  00003530
00162C D5D6E3C6C5D5C74C          506         DC    CL20'NOTHING             .  00003540
001640 D5D6E3E6C9E3C8E2          507         DC    CL20'NOTWITHSTANDING     .  00003550
001654 D5D6E6C4C404C4040         508         DC    CL20'NOW                 .  00003560
001668 D5D6E6C6C5D5C540          509         DC    CL20'NOWHERE             .  00003570
00167C D6C6404040404C4040        510         DC    CL20'OF                  .  00003580
001690 D6C6C6404C4C4040          511         DC    CL20'OFF                 .  00003590
0016A4 D6C6E3C5D54C4C4C          512         DC    CL20'OFTEN               .  00003600
0016B8 D6D240404040C4040         513         DC    CL20'ON                  .  00003610
0016CC D6D54C4C4C4C4040          514         DC    CL20'ONCE                .  00003620
0016E0 D6D5C3C5404C4C4C          515         DC    CL20'ONE                 .  00003630
0016F4 D6D5C540404040C4040       516         DC    CL20'ONLY                .  00003640
001708 D6D5D3E6E4C4C4C4C         517         DC    CL20'ONTO                .  00003650
00171C D6D5E3D6404C4040          518         DC    CL20'OR                  .  00003660
001730 D6D94C4C4C4C4040          519         DC    CL20'OTHER               .  00003670
001744 D6E3C6C5D54C4040          520                                           00003680
```

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

```
LOC    OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT
001758 D6E3C6C5C9E24040              521         DC    CL20'OTHERS          '  00003690
00176C D6E3C6C5D5E6C9E2              522         DC    CL20'OTHERWISE       '  00003700
001780 D6E4D5C4C4C4C040              523         DC    CL20'OUR             '  00003710
001794 D6E4D5E240404040              524         DC    CL20'OURS            '  00003720
0017A8 D6E4E3404C4C4040              525         DC    CL20'OUT             '  00003730
0017BC D6E4E3E2C5C4C54C              526         DC    CL2C'OUTSIDE         '  00003740
0017D0 D6E5C5D540404040              527         DC    CL20'OVER            '  00003750
0017E4 D6E5C5D5C3C6C4C5              528         DC    CL20'OVERCOME        '  00003760
0017F8 D6E5C5D9D3E8404C              529         DC    CL20'OVERLY          '  00003770
00180C D6E6D5404C4C4C40              530         DC    CL20'OWN             '  00003780
001820 D6E6D5C5D5C74C4C              531         DC    CL20'OWNING          '  00003790
001834 D6E6D5E2404C4040              532         DC    CL20'OWNS            '  00003800
001848 D7C1D5E3D3E8404C              533         DC    CL20'PARTLY          '  00003810
00185C D7C5D5C4C5D5C740              534         DC    CL20'PENDING         '  00003820
001870 D7C5D5404040404C              535         DC    CL20'PER             '  00003830
001884 D7C5D9C8C1D7E240              536         DC    CL20'PERHAPS         '  00003840
001898 D7D6E2E2C9C2D3C5              537         DC    CL2C'POSSIBLE        '  00003850
0018AC D7E4E34040404040              538         DC    CL20'PUT             '  00003860
0018C0 D8E4C5C3D24C4C4C              539         DC    CL20'QUICK           '  00003870
0018D4 D8E4C9C3D2C3E840              540         DC    CL20'QUICKLY         '  00003880
0018E8 D8E4C5E3C54C404C              541         DC    CL20'QUITE           '  00003890
0018FC D9C1E3C6C5D5C4C4              542         DC    CL2C'RATHER          '  00003900
001910 D9C5C1C4C9C3E840              543         DC    CL20'READILY         '  00003910
001924 D9C5C1D3D3E84040              544         DC    CL20'REALLY          '  00003920
001938 D9C5C7C1D5C44040              545         DC    CL20'REGARD          '  00003930
00194C D9C5D3C1E3C54040              546         DC    CL2C'RELATE          '  00003940
001960 D9C5E2E4D3E34040              547         DC    CL20'RESULT          '  00003950
001974 D9C5E3E4D5C54C4C              548         DC    CL20'RETURN          '  00003960
001988 E2C1C5C4404040C0              549         DC    CL20'SAID            '  00003970
00199C E2C1D4C54C4C404C              550         DC    CL20'SAME            '  00003980
0019B0 E2C1E3404C4C4C40              551         DC    CL20'SAT             '  00003990
0019C4 E2C1E5C54C4C4040              552         DC    CL20'SAVE            '  00004000
0019D8 E2C1E5C5C44C4C4C              553         DC    CL20'SAVED           '  00004010
0019EC E2C1E5C5E2404040              554         DC    CL20'SAVES           '  00004020
001A00 E2C1E6C4C4C4C040              555         DC    CL20'SAW             '  00004030
001A14 E2C1E6E404C4C4C0              556         DC    CL20'SAY             '  00004040
001A28 E2C1E6E240404040              557         DC    CL20'SAYS            '  00004050
001A3C E2C5C540404C4C40              558         DC    CL20'SEE             '  00004060
001A50 E2C5C5D44C4C4040              559         DC    CL20'SEEM            '  00004070
001A64 E2C5C5D4E2404040              560         DC    CL20'SEEMS           '  00004080
001A78 E2C5C5D54C4C4040              561         DC    CL20'SEEN            '  00004090
001A8C E2C5C5E2404C4C4C              562         DC    CL20'SEES            '  00004100
001AA0 E2C5E5C5D54C4C40              563         DC    CL20'SEVEN           '  00004110
001AB4 E2C5E5C5D5C1D340              564         DC    CL20'SEVERAL         '  00004120
001AC8 E2C8C1D3C3404040              565         DC    CL20'SHALL           '  00004130
001ADC E2C8C54C4C4C4040              566         DC    CL20'SHE             '  00004140
001AF0 E2C8D6E4D3C4404C              567         DC    CL2C'SHOULD          '  00004150
001E04 E2C8D6E6D5404040              568         DC    CL20'SHOWN           '  00004160
001B18 E2C9D5C3C54C4C40              569         DC    CL20'SINCE           '  00004170
001B2C E2C9E340404C4040              570         DC    CL20'SIT             '  00004180
001B40 E2C9E3E24C404040              571         DC    CL20'SITS            '  00004190
001B54 E2C9E3E3C5C5C74C              572         DC    CL20'SITTING         '  00004200
001B68 E2C9E74C4C4C4040              573         DC    CL20'SIX             '  00004210
001B7C E2D64C4C404C4C40              574         DC    CL20'SO              '  00004220
001B90 E2D6D4C54C4C404C              575         DC    CL20'SOME            '  00004230
```

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

```
LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT
001EA4 E2D6D4C5E3C8C9D5          576        DC    CL20'SOMETHING      ' 00004240
001EB8 E2D6D4C5E3C9D4C5          577        DC    CL20'SOMETIME       ' 00004250
001BCC E2D6D6D54C4C4C40          578        DC    CL20'SOCN           ' 00004260
001BE0 E2E3C9C3C34C4040          579        DC    CL20'STILL          ' 00004270
001BF4 E2E3D6D6C44C4040          580        DC    CL20'STOOD          ' 00004280
001C08 E2E4C3C84C4C4C4C          581        DC    CL20'SUCH           ' 00004290
001C1C E2E4D5C540404040          582        DC    CL20'SURE           ' 00004300
001C30 E3C1D2C54C4C4C4C          583        DC    CL20'TAKE           ' 00004310
001C44 E3C1D2C5D54C4C40          584        DC    CL20'TAKEN          ' 00004320
001C58 E3C1D2C5E24C4C40          585        DC    CL20'TAKES          ' 00004330
001C6C E3C1D2C9D5C74C40          586        DC    CL20'TAKING         ' 00004340
001C80 E3C5D54C40404040          587        DC    CL20'TEN            ' 00004350
001C94 E3C8C1D54C4C4040          588        DC    CL20'THAN           ' 00004360
001CA8 E3C8C1E34C4C404C          589        DC    CL20'THAT           ' 00004370
001CBC E3C8C54040404040          590        DC    CL20'THE            ' 00004380
001CD0 E3C8C5C9D54C4040          591        DC    CL20'THEIR          ' 00004390
001CE4 E3C8C5D44C4C4C4C          592        DC    CL20'THEM           ' 00004400
001CF8 E3C8C5D4E2C5D3E5          593        DC    CL20'THEMSELVES     ' 00004410
001D0C E3C8C5D54C4C4C4C          594        DC    CL20'THEN           ' 00004420
001D20 E3C8C5C9C54C4040          595        DC    CL20'THERE          ' 00004430
001D34 E3C8C5D9C5C2E840          596        DC    CL20'THEREBY        ' 00004440
001D48 E3C8C5D9C5C5D6D5          597        DC    CL20'THEREFORE      ' 00004450
001D5C E3C8C5D9C5C9E540          598        DC    CL20'THEREIN        ' 00004460
001D70 E3C8C5E2C54C4040          599        DC    CL20'THESE          ' 00004470
001D84 E3C8C5E4C4C4C040          600        DC    CL20'THEY           ' 00004480
001D98 E3C8C9E240C4C040          601        DC    CL20'THIS           ' 00004490
001DAC E3C8D6E2C54C4040          602        DC    CL20'THOSE          ' 00004500
001DC0 E3C8D6E4C7C6E4C40         603        DC    CL20'THOUGH         ' 00004510
001DD4 E3C8D9C5C5404040          604        DC    CL20'THREE          ' 00004520
001DE8 E3C8D9D6E4C7C6E4C         605        DC    CL20'THROUGH        ' 00004530
001DFC E3C8E4E24C4C4040          606        DC    CL20'THUS           ' 00004540
001E10 E3C9D4C5E24C4040          607        DC    CL20'TIMES          ' 00004550
001E24 E3D6C4C4C4C4C4C4C         608        DC    CL20'TO             ' 00004560
001E38 E3D6C7C5E3C8C5C9          609        DC    CL20'TOGETHER       ' 00004570
001E4C E3D6D640404C4040          610        DC    CL20'TOO            ' 00004580
001E60 E3D6D6D24C4C4C40          611        DC    CL20'TOOK           ' 00004590
001E74 E3D6E6C1D5C44040          612        DC    CL20'TOWARD         ' 00004600
001E88 E3D9C9C5C5C44C4040        613        DC    CL20'TRIED          ' 00004610
001E9C E3D9E4C4C4C4C4C4C         614        DC    CL20'TRY            ' 00004620
001EB0 E3E6D64C40404040          615        DC    CL20'TWO            ' 00004630
001EC4 E4D5C4C5D5C4C4C4C         616        DC    CL20'UNCER          ' 00004640
001ED8 E4D5C4C5D5C7D640          617        DC    CL20'UNDERGO        ' 00004650
001EEC E4D5C4C5D5E5C5C1          618        DC    CL20'UNDERNEATH     ' 00004660
001F00 E4D5D3C5E2E24040          619        DC    CL20'UNLESS         ' 00004670
001F14 E4D5E3C9D34C4040          620        DC    CL20'UNTIL          ' 00004680
001F28 E4D7404C404C4040          621        DC    CL20'UP             ' 00004690
001F3C E4D7D6D54C4C4C40          622        DC    CL20'UPON           ' 00004700
001F50 E4E2404C4C4C4040          623        DC    CL20'US             ' 00004710
001F64 E4E2C5404C4C4040          624        DC    CL20'USE            ' 00004720
001F78 E4E2C5D5C74C4C4C          625        DC    CL20'USING          ' 00004730
001F8C E4E2E4C1D3404040          626        DC    CL20'USUAL          ' 00004740
001FA0 E4E2E4C1D3D3E84C          627        DC    CL20'USUALLY        ' 00004750
001FB4 E5C1D9C9C6E4E240          628        DC    CL20'VARIOUS        ' 00004760
001FC8 E5C1D9E84C4C4040          629        DC    CL20'VARY           ' 00004770
001FDC E5C5D9E2E4E2404C          630        DC    CL20'VERSUS         ' 00004780
```

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

```
  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F30SEP69  6/17/70

001FF0 E5C5D5E8404C4040             631         DC    CL20'VERY            '                    00004790
002004 E5C5C14C4C4C404C             632         DC    CL20'VIA             '                    00004800
002018 E5E24C4C4C4C4C40             633         DC    CL20'VS              '                    00004810
00202C E6C1D5E340404040             634         DC    CL20'WANT            '                    00004820
002040 E6C1E240404C4040             635         DC    CL20'WAS             '                    00004830
002054 E6C54C40404C4040             636         DC    CL20'WE              '                    00004840
002068 E6C5D5E340404040             637         DC    CL20'WENT            '                    00004850
00207C E6C5D5C54C4C404C             638         DC    CL20'WERE            '                    00004860
002090 E6C8C1E3404C404C             639         DC    CL20'WHAT            '                    00004870
0020A4 E6C8C1E3C5E5C5D9             640         DC    CL20'WHATEVER        '                    00004880
0020B8 E6C8C5D54C4C4C4C             641         DC    CL20'WHEN            '                    00004890
0020CC E6C8C5C5C5E5C5D9             642         DC    CL20'WHENEVER        '                    00004900
0020E0 E6C8C5D5C54C4040             643         DC    CL20'WHERE           '                    00004910
0020F4 E6C8C5D9C5C1E24C             644         DC    CL20'WHEREAS         '                    00004920
002108 E6C8C5D5C5C2E840             645         DC    CL20'WHEREBY         '                    00004930
00211C E6C8C5D9C5C6D6D9             646         DC    CL20'WHEREFORE       '                    00004940
002130 E6C8C5D9C5C5D540             647         DC    CL20'WHEREIN         '                    00004950
002144 E6C8C5D9C5D6C640             648         DC    CL20'WHEREOF         '                    00004960
002158 E6C8C5D5C5E5C5D5             649         DC    CL20'WHEREVER        '                    00004970
00216C E6C8C5E3C8C5D54C             650         DC    CL20'WHETHER         '                    00004980
002180 E6C8C9C3C8C4C4C4             651         DC    CL20'WHICH           '                    00004990
002194 E6C8C9C3C8C5E5C5             652         DC    CL20'WHICHEVER       '                    00005000
0021A8 E6C8C9D3C5404040             653         DC    CL20'WHILE           '                    00005010
0021BC E6C8D6E4C4C4C040             654         DC    CL20'WHO             '                    00005020
0021D0 E6C8D6D3C54C4C40             655         DC    CL20'WHOLE           '                    00005030
0021E4 E6C8D6D3D3E84040             656         DC    CL20'WHOLLY          '                    00005040
0021F8 E6C8D6D4404C4040             657         DC    CL20'WHOM            '                    00005050
00220C E6C8D6E2C54C4040             658         DC    CL20'WHOSE           '                    00005060
002220 E6C8E84C40404040             659         DC    CL20'WHY             '                    00005070
002234 E6C9D3D34C4C4C4C             660         DC    CL20'WILL            '                    00005080
002248 E6C9E3C8404C4C40             661         DC    CL20'WITH            '                    00005090
00225C E6C9E3C8C5D54040             662         DC    CL20'WITHIN          '                    00005100
002270 E6C9E3C8D6E4E34C             663         DC    CL20'WITHOUT         '                    00005110
002284 E6D6D5E340404040             664         DC    CL20'WONT            '                    00005120
002298 E6D6E4D3C44C4040             665         DC    CL20'WOULD           '                    00005130
0022AC E8C5E24C4040404C             666         DC    CL20'YES             '                    00005140
0022C0 E8C5E34040404C4040           667         DC    CL20'YET             '                    00005150
0022D4 E8D6E44C4C4C4040             668         DC    CL20'YOU             '                    00005160
0022E8 E8D6E4D54C4C4040             669         DC    CL20'YOUR            '                    00005170
0022FC E8D6E4D9E2404040             670         DC    CL20'YOURS           '                    00005180
002310 E8D6E4D5E2C5C3C6             671         DC    CL20'YOURSELF        '                    00005190
000000                              672         END   BEGIN                                      00005200
```

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

RELOCATION DICTIONARY

6/17/70

PCS.ID	REL.ID	FLAGS	ADDRESS
01	01	08	000015
01	01	CE	CCCC19
01	01	CE	C0C145
01	01	08	000151
01	01	CE	000361

FIGURE V-I (CONTINUED)
KWOC-I PROGRAM LISTING

SYMBOL	LEN	VALUE	DEFN	REFERENCES						
ADCBR	000C4	00C136	00108							
BEGIN	000C2	000000	00016	0072						
BLANK	00002	0002D0	00140	0033	0046					
BLWORD	00020	000206	00147	004E	0091	0100				
CARD	00080	000225	00133	003E	0050					
CLEAR	000C6	000040	00046							
CLRWORD	000C6	000116	00100	0079	0088	0092				
COLON	00001	0002E2	00141	0081						
CONST	00004	000408	00271	0086						
DATAOUT	00125	000188	00132	0046	0047	0047	0093	0094	0097	
DUMMY	00002	000204	00143	0051						
ENDNAM	000C2	000206	00135	0052	0065					
EQUALS	000C1	000203	00142	0083						
FOUR	00002	0002CA	00137	0055						
INDCB	000C4	000340	00159	0027	0037	0116				
LNAME	00081	000215	00134	005C	0051	0057	0094			
LOADTAB	00004	0000E8	00085	0082						
LOOP	000C4	000056	00052	0068	0077	0109				
MAINLINE	000C4	00002A	00037	0054	0056	0072	0103	0105	0107	
MOVNAM	000C6	000052	00050							
MOVWRD	000C4	000056	00071	0059	0061					
NEARLY	00002	000208	00136	0102						
ON	00004	000088	00078	0053	0066	0075				
ONE	000C2	000200	00139	0063	0067	0073	0074	0076	0078	0108
OUTCCB	000C4	000340	00216	0029	0096	0122				
RDEOF	00004	000140	00114	0178						
SAVEAREA	000C4	000160	00130	002C	0021	0124				
SKPSUB	00004	000094	00067							
SPACE	00080	0002FE	00149							
STCR	00004	000082	000E2							
STCRLAST	00006	0000F2	00091	0084						
TABLE	00020	000400	00274	0085						
TABLOOP	00006	000CEC	00087	009C						
WORD	00020	0002EA	00148	0048	0062	008C	0087	0091	0093	0100
ZERO	000C2	000200	00138	0071						

NO STATEMENTS FLAGGED IN THIS ASSEMBLY
STATISTICS SOURCE RECORDS (SYSIN) = 533 SOURCE RECORDS (SYSLIB) = 2211
OPTIONS IN EFFECT LIST, DECK, NOLOAD, NORENT, XREF, NOTEST, ALGN, OS, LINECNT = 55
612 PRINTED LINES

FIGURE V-I (CONCLUDED)
KWOC-I PROGRAM LISTING

```
KWOC2 PRINT PROGRAM                                                                                    PAGE    1

  LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                                    F30SEP69   6/17/70

                                     2 *
CCCCCO                               3          CSECT                                                  00000020
                                     4 BEGIN    SAVE  (14,12)                                          00000030
CCCCCO                               5+BEGIN    DS    OH                                               00000040
CCCCCO 90EC D00C           0000C     6+         STM   14,12,12(13) SAVE REGISTERS
CCCCC4 05C0                          7          BALR  12,0
000006                               8          LSING *,12                                             00000050
CCCCC6 50D0 C19E           001A4     9          ST    13,SAVEAREA+4                                    00000060
CCCCCA 41D0 C19A           001A0     10         LA    13,SAVEAREA                                      00000070
                                     11         PRINT NOGEN                                            00000080
                                     12         OPEN  (CARDDCB,,INDCB,,PRNTDCB,(OUTPUT))               00000090
000022 4820 C23E           00244     22         LH    2,ONE          SWITCH FOR FIRST HEADING          00000100
000026 1833                          23         SR    3,3                  * * * * * * *               00000110
CCCC28 1844                          24         SR    4,4                  *         *                 00000120
CCCC2A 1855                          25         SR    5,5                  *  CLEAR  *                 00000130
CCCC2C 1866                          26         SR    6,6                  * REGISTERS *               00000140
CCCC2E 4870 C23E           00244     27         LH    7,ONE          SWITCH FOR FIRST USE OF NEW FIRST CHARACTER 00000150
000032 1888                          28         SR    8,8                  * * * * * * *               00000160
CCCC34 1899                          29         SR    9,9                                              00000170
CC003E 4390 C23C           00242     30         IC    9,ALPHA          INSERT 'A' IN REG. 9            00000180
00003A 48A0 C23E           00244     31         LH    10,ONE                                           00000190
                                     32 *  REG. 10 IS USED AS A SWITCH                                 00000200
C0003E 4180 C232           00238     33         LA    8,NOPRINT                                        00000210
                                     34 *                           LOAD ADDRESS OF RECORD SUPPRESS   00000220
                                     35         GET   CARDDCB,CARD   CHARACTERS                        00000230
                                     40 *                                                             00000240
                                     41 *                           READ PARAMETER/DATE CARD          00000250
                                     42 *                                DATE IN CC. 1-20             00000260
                                     43 *                                SUPPRESSION CHARACTERS IN 21-27 00000270
                                     44 *                                WITH NO EMBEDDED BLANKS      00000280
CCCC5C 4130 C1F6           001FC     45         LA    3,CARD+20                                        00000290
CCC054 9540 300C           00000     46 LCOP1   CLI   0(3),X'40'        LOAD ADDRESS OF 1ST CHARACTER   00000300
CCC058 4780 C06C           00072     47         BE    EXIT1            COMPARE CHARACTER WITH BLANK    00000310
                                     48 *                              BRANCH IF IT IS.               00000320
000050 D200 8000 3CC0 CCCCC C0000    49         MVC   0(1,8),0(3)      MOVE SUPPRESS CHARACTER TO NOPRINT 00000330
CCC062 4A60 C23E           00244     50         AH    6,ONE            ADD 1 TO CHARACTER COUNT        00000340
CCC066 4A30 C23E           00244     51         AH    3,ONE            ADD 1 TO INDEX FOR CARD         00000350
00006A 4A80 C23E           00244     52         AH    8,ONE            ADD 1 TO INDEX  FOR NOPRINT     00000360
CCCC6E 47F0 CC4E           00054     53         B     LOOP1            GET NEXT CHAPACTER              00000370
CCCC72 406C C240           0C246     54 EXIT1   STH   6,COUNT      STORE COUNT FOR LOOP COUNTER        00000380
000076 D200 C2C1 C23C 002C7 00243    55         MVC   TOPLINE(1),BLANK       INSERT BLANK IN HEADING LINE; 00000390
CCCC7C D25A C2C2 C2C1 0C2C8 002C7    56         MVC   TOPLINE+1(91),TOPLINE  PROPAGATE BLANKS THRU FIELD; 00000400
CCCC82 D213 C31C C1E2 CC322 0C1E8    57         MVC   TOPLINE+91(20),CARD    PUT DATE IN HEADING       00000410
CCC088 4130 C232           00238     58         LA    3,NOPRINT                                        00000420
CCCC8C 1B88                          59         SR    8,8                                              00000430
CCCC8E 47F0 C138           C013E     60         B     HEADING                                          00000440
                                     61 *                        PRINT FIRST HEADING                 00000450
CCCCA0 4960 C242           0C248     62 LCCP    GET   INCCB,INAREA     GET A RECORD                    00000460
CCCCA4 4780 C08C           000C2     67         CH    6,ZERO       CHECK TO SEE IF ANY SUPPRESS CHARACTERS 00000470
CCCCA8 D500 300C C244 CCCCC 0C24A    68         BE    INSERT                                           00000471
                                     69 TESTCHAR CLC  0(1,3),INAREA     COMPARE FIRST CHARACTER OF RECORD 00000472
CCCCAE 4780 CC8C           00092     70 *                               WITH EACH SUPPRESS CHARACTER    00000480
                                     71         BE    LOOP             BRANCH IF IT IS.                00000490
000082 4A30 C23E           00244     72 *                                                             00000500
                                     73         AH    3,ONE        INCREMENT ADDRESS IN REG.3          00000510
                                                                                                      00000520
```

FIGURE V-2
KWOC-2 PROGRAM LISTING

```
 LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                F30SEP69  6/17/70
000CB6 4660 C0A2             00A8   74           BCT   6,TESTCHAR        BRANCH BACK IF COUNT NOT COMPLETE   00000530
                                    75 *                                                                     00000540
000CBA 4860 C240             0246   76           LH    6,COUNT                                               00000550
000CBE 4130 C232             0238   77           LA    3,NOPRINT                                             00000560
                                    78 *                                                                     00000570
                                    79 *                                                                     00000580
000CC2 4340 C244             024A   80 INSERT     IC    4,INAREA          IF RECORD IS TO BE PRINTED, TEST    00000590
                                    81 *                                 TO SEE WHETHER FIRST CHARACTER IS TO 00000600
000CC6 1594                         82           CLR   9,4                BE REPLACED WITH A BLANK FOR PRINT   00000610
                                    83 *                                 CHARACTERS < A WILL BE BLANKED.      00000620
000CC8 4780 C1E4             016A   84           BE    FIRST                                                 00000630
000CCC 4700 C0E8             00EE   85           BNH   MOVE                                                  00000640
                                    86 *   IF 1ST CHAR. IS A OR HIGHER IN COLLATING SEQUENCE, SKIP TO MOVE   00000650
                                    87 *   THE FIRST 'A' REQUIRES A PAGE SKIP FOR SEPARATING LISTINGS        00000660
                                    88 *                                                                     00000670
000CD0 4570 C23E             0244   89 TESTPRNT  CH    7,ONE      IS IT FIRST TIME FOR THIS FIRST CHARACTER? 00000680
000CD4 4770 C0D6             00DC   90           BNE   SUB                                                   00000690
000CD8 4380 C244             024A   91           IC    8,INAREA          STORE THIS AS NEW FIRST CHARACTER    00000700
000CDC 1877                         92 SUB       SR    7,7                                                   00000710
000CDE D200 C244 C23D 024A 0243     93 BLANKIT   MVC   INAREA(1),BLANK                                       00000720
                                    94 *                                 PUT BLANK IN FIRST PRINT POSITION   00000730
000CE4 1548                         95           CLR   4,8                                                   00000740
                                    96 *                                 AS LONG AS CHARACTER DOESN'T CHANGE, 00000750
000CE6 4780 CCE8             00EE   97           EE    MOVE          CONTINUE.                               00000760
                                    98 *                                                                     00000770
                                    99 *                                 SKIP TO NEW PAGE                    00000780
000CEA 47F0 C172             0178  100           B     NEWLIST                                               00000790
                                   101 *                                                                     00000800
000CEE D26E C330 C244 0336 024A    102 MOVE       MVC   OUTAREA(111),INAREA                                   00000810
                                   103 *   TEST FOR PRINTER OVERFLOW ON NEXT PRINT LINE.  IF OVERFLOW WILL   00000820
                                   104 *   OCCUR, SKIP TO HEADING, START NEW PAGE, AND RETURN TO PRINT.      00000830
                                   105            PRTOV PRNTDCB,12,HEADING                                  00000840
                                   121 PRINT      PUT   PRNTDCB,OUTAREA                                     00000850
000C13A 47F0 C08C            0092  126           B     LOOP                                                  00000860
                                   127 *                                                                     00000870
                                   128 HEADING    CNTRL PRNTDCB,SK,1                                        00000880
                                   134           PUT   PRNTDCB,TOPLINE                                     00000890
000C15C 4920 C23E             244  139           CH    2,ONE          TEST SWITCH                          00000900
000160 4770 C0E8             0EE  140           BNE   MOVE            R.2 WILL BE 1 FOR FIRST HEADING      00000910
000C164 1822                        141           SR    2,2            THEREAFTER, ZERO.                    00000920
000C166 47F0 C08C            0092  142           B     LOOP                                                  00000930
                                   143 *                                                                     00000940
00016A 1B88                        144 FIRST      SR    8,8                                                   00000950
000C16C 15A8                       145           CLR   10,8                                                  00000960
00016E 4780 C0E8             00EE  146           BE    MOVE                                                  00000970
000C172 1BAA                       147           SR    10,10                                                 00000980
000C174 47F0 C13E            013E  148           B     HEADING                                               00000990
000C178 4870 C23E             244  149 NEWLIST   LH    7,ONE          RESET NEW FIRST CHARACTER SWITCH     00001000
000C17C 1B88                       150           SR    8,8                                                   00001010
00017E 47F0 C138             013E  151           B     HEADING                                               00001020
                                   152 *                                                                     00001030
                                   153 RCEOF      CLOSE (CARDDCB,,INDCB,,PRNTDCB)                           00001040
000196 58D0 C19E             01A4  163           L     13,SAVEAREA+4                                         00001050
                                   164           RETURN (14,12)                                            00001060
                                   167 *                                                                     00001070
```

FIGURE V-2 (CONTINUED)
KWOC-2 PROGRAM LISTING

```
  LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                                                    F30SEP69  6/17/70
0001A0                                168            DS    0F                                                                 00001080
0001A0                                169 SAVEAREA  DS    18F                                                                00001090
0001E8                                170 CARD      DS    CL80                                                               00001100
000238                                171 NOPRINT   DS    CL8                                                                00001110
000240 0049                           172 DUMMY     DC    XL2'49'                                                            00001120
000242 C1                             173 ALPHA     DC    CL1'A'                                                             00001130
000243 40                             174 BLANK     DC    CL1' '                                                             00001140
000244 0001                           175 ONE       DC    H'1'                                                               00001150
000246                                176 COUNT     DS    H                                                                  00001160
000248 0000                           177 ZERO      DC    H'0'                                                               00001161
00024A                                178 INAREA    DS    CL125                                                              00001170
0002C7 4040404C404C4040               179 TOPLINE   DC    CL111' '                                                           00001180
000336                                180 OUTAREA   DS    CL111                                                              00001190
                                      181 CARDDCB   DCB   DDNAME=CARDD2,DEVD=RD,DSORG=PS,EODAD=RDEOF,                      X00001200
                                                          LRECL=80,RECFM=FB,BLKSIZE=80,MACRF=(GM)                            00001210
                                      237 *                                                                                  00001220
                                      238 INDCB     DCB   BFALN=F,BFTEK=S,BLKSIZE=6250,DDNAME=QUICOUT,DEVD=DA,            /00001230
                                                          DSORG=PS,EROPT=SKP,EODAD=RDEOF,LRECL=125,MACRF=(GM),           /00001240
                                                          RECFM=FB                                                           00001250
                                      294 *                                                                                  00001260
                                      295 PRNTDCB   DCB   BFALN=F,BFTEK=S,DSORG=PS,PRTSP=1,BLKSIZE=1110,DEVD=PR,         /00001270
                                                          DDNAME=CDPRINTG,LRECL=111,MACRF=(PMC),RECFM=FB,EROPT=SKP       00001280
                                      351           END                                                                      00001290
```

FIGURE V-2 (CONTINUED)
KWOC-2 PROGRAM LISTING

RELOCATICA CICTIONARY

6/17/70

PCS.ID	REL.ID	FLAGS	ADDRESS
01	C1	CE	000015
01	C1	CE	C00019
01	C1	CE	CCCC1D
01	01	08	000189
C1	C1	CE	CCC18D
01	01	CE	C00191
01	C1	08	000389
C1	C1	CE	000419

FIGURE V-2 (CONTINUED)
KWOC-2 PROGRAM LISTING

SYMBOL	LEN	VALUE	DEFN	REFERENCES
ALPHA	000C1	00C242	CC173	003C
BEGIN	000C2	CCCCCC	0CCC5	
BLANK	00001	000243	00174	0055 0093
BLANKIT	C0CC6	CCCCDE	CCC53	
CARD	00080	0CC1E8	0C170	0037 0045 C057
CARDDCB	000C4	0CC358	0C186	0016 0036 0157
CCUNT	CC0C2	CCC24E	0C17E	0054 0076
DUMMY	00002	000240	00172	
EXIT1	CCCC4	CCCC72	0C054	0047
FIRST	000C2	00C16A	0C144	CC84
HEADING	00004	00C13E	00129	0060 0119 C148 C151
INAREA	00125	0CC24A	00178	0064 0069 0080 0091 0093 0102
INDCB	C0CC4	0CC3F8	0C243	0C1E 0C63 C159
INSERT	00004	0000C2	00080	0068
LOOP	CCCC4	0CCC52	CCC63	CC71 0126 0142
LOOP1	00004	00CC54	0CC46	0053
MOVE	000C6	0000EE	00102	0085 0097 0140 0146
NEWLIST	000C4	0CC178	CC149	010C
NOPRINT	000C8	00C238	00171	0033 0058 C077
ONE	0CCC2	0C0244	0C175	0022 0027 0031 0050 0051 0052 0073 0089 0139 0149
OUTAREA	C0111	00C23E	0C18C	0102 0123
PRINT	00004	000120	00122	
PRNTDCB	000C4	0CC448	C0300	0020 0106 0115 0122 0129 0135 0161
RDEOF	C00C4	C0C1E4	0C155	0205 0262
SAVEAREA	00004	000180	00169	0009 0010 0163
SUB	C00C2	CCCCDC	00052	CC9C
TESTCHAR	00006	0CCCA8	0CC69	0074
TESTPRNT	000C4	0000D0	00089	
TOPLINE	00111	CCC2C7	0C179	0055 0056 C056 0057 0136
ZERO	00002	0CC248	00177	0067

NO STATEMENTS FLAGGED IN THIS ASSEMBLY
STATISTICS SOURCE RECORDS (SYSIN) = 132 SOURCE RECORDS (SYSLIB) = 2330
OPTIONS IN EFFECT LIST, DECK, NOLOAD, NORENT, XREF, NOTEST, ALGN, OS, LINECNT = 55
189 PRINTED LINES

FIGURE V-2 (CONCLUDED)
KWOC-2 PROGRAM LISTING

BIBLIOGRAPHY

Becker, Joseph and Robert M. Hayes, Information Storage and Retrieval: Tools, Elements, Theories, John Wiley & Sons, Inc., 1963.

Bourne, C. P., Methods of Information Handling, John Wiley & Sons, Inc., New York, 1963.

Cuadra, Carlos A., ed., American Documentation Institute Annual Review of Information Science and Technology, Vol. 1, John Wiley & Sons, Inc., New York, 1966.

Finerman, A. and L. Revens, eds., Permuted Subject Index to Computing Reviews 1964-1965, Association for Computing Machinery, New York, 1964.

Fischer, M., "The KWIC Index Concept: A Retrospective View," American Documentation, 17(4), 1966.

Holm, B. E., How to Manage Your Information, Rheinhold Book Corporation, New York, 1968.

Kent, A., Textbook on Mechanized Information Retrieval, Interscience Publishers, New York, 1962.

Kraft, D. M., "A Comparison of Keyword-In-Context (KWIC) Indexing of Titles with a Subject Heading Classification System," American Documentation, 15(1), 1964.

Linder, L. H., "Comparative Costs of Document Indexing and Book Cataloging," Special Libraries 56, December, 1965.

Tenner, R. J., "The Practice of Charging Users for Information Services: A State of the Art Report," Journal of the American Society for Information Science 21(1), 1970.

Sharp, John R., Some Fundamentals of Information Retrieval, Longon House & Maxwell, New York, 1965.

Strain, P. M., KWIC and Easy? A Librarian's View of a Computer Based Technical Reports Announcement System, IBM Corporation, Space Guidance Center, Owego, New York, Report No. 64-825-1164.

Williams, W. F., Principles of Automated Information Retreival, The Business Press, Elmhurst, Illinois, 1965.